Chemical Age

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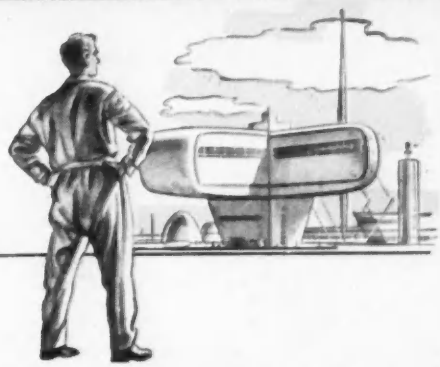

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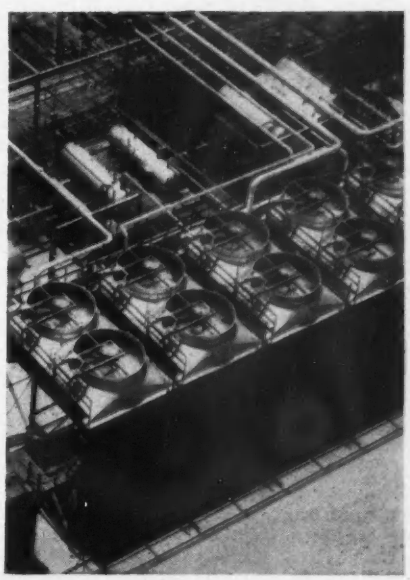

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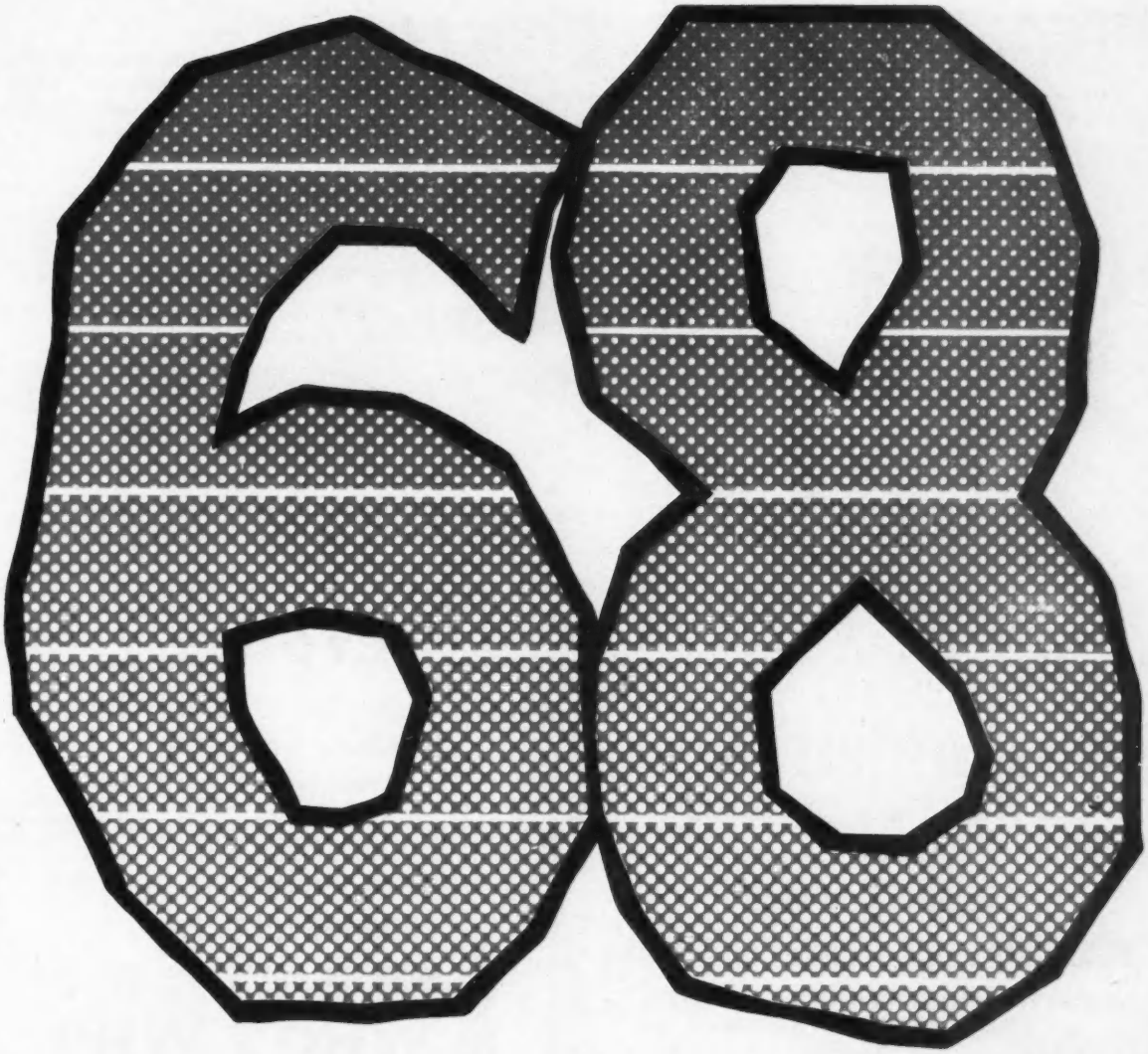

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Annual subscription is: home, 52s 6d, overseas, 60s, single copies 1s 6d (by post 1s 9d)

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CHEMICAL AGE

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MANAGEMENT

DURING the last decade, great changes have taken place in the U.K.'s industrial environment, in technology, in markets, and in the scale and scope of operations. In considering all this, the question to be asked is: Has management been successful in evolving its techniques and attitudes to meet the changing conditions now being experienced? This question and all it implies was considered by Sir Alexander Fleck last week when he addressed the British Institute of Management's Joint Scottish Conference on 'Relationships in industry—some changing concepts of management.' He was concerned in particular with 'Scotland's management evolution.'

Education fully and properly used, the diligence of the working man and capital investment per head of the population are the setting in which management can be expected to evolve, said Sir Alexander. Other criteria are: productivity, where management techniques, work study and accurate cost control, for example, cannot be neglected; the number of days lost per man in industrial disputes (an almost unheard of occurrence in U.K. chemical industry); and safety.

No one will deny that some four or even three decades ago, factory life was a good deal simpler than it is today. Then the technical man in charge could and did take his own decisions individually and largely unaided. Today, as Sir Alexander points out, impromptu decisions in personnel matters are frequently fraught with serious pitfalls, and as all know to their cost, a wrong decision can be felt throughout an industry, and indeed, throughout the country. Today, says Fleck, "a works manager needs to be fortified not only with statistics but also with the specialist advice of the personnel manager. The latter is not just there as a glorified welfare officer, but should be of such calibre and in such a position as to be able to stimulate managers into progressive thought and action.' This view of the work of a personnel officer, we believe, is very much wider than most managements envisage. The key lies, however, in the calibre of the man appointed.

Another controversial point raised by Fleck is the 'turn list' system. It is felt to be the negation of management to accept the position that when a job falls vacant it is the turn of the man next in seniority to fill it regardless of his suitability. It is suggested that this is the negation of good management because it shrugs off the responsibility for making perhaps unpopular but necessary changes to improve efficient working, with the excuse that the system does not allow it.

Sir Charles Renold (*Financial Times Annual Review of Industry*) has stated that if relationships are right between management and men, between the men and their unions and between the unions and the management, the atmosphere is right for industrial advance. But these group relationships in turn all depend on good relationships between the individuals concerned. What then, are the important things in attempting to achieve harmonious relationships?

Viewing this last question from his very long experience with Britain's largest chemical manufacturing concern, Imperial Chemical Industries Ltd., Fleck considers joint consultation to be the keystone, with the basis of

approach two-fold. The first is relations with the trade unions. Vital though these may be, they are, however, complementary to and not a substitute for direct dealings with the men on the plant. The second basis, then, for good relations in a factory is that the men should know what the management is thinking. In I.C.I. managers at all levels are encouraged to seize every opportunity to get to know their opposite numbers in the unions.

Works Councils are prominent in I.C.I. Each works of the company has its own council, consisting of nominated management and elected payroll representatives which meets regularly to discuss any matters not the subject of negotiations with the trade unions. Works councils send delegates to a division council and then finally twice a year elected representatives of the payroll workers and appointed members of their works management meet the executive board of the company under Fleck's chairmanship. While this set-up has been successfully organised, the corresponding framework which would give the opportunity for direct contact between top management and junior staff who work in I.C.I.'s laboratories and offices has not yet been worked out.

One important condition for good industrial relations between management and unions and management and factory payroll people direct is a sound wages structure. "The essence of a good wages structure," states Fleck, "is its explainability. If you cannot rationally explain why a change in wages has to be refused, you are already more than half way towards some sort of conflict."

A call is made by Fleck to remove "the entirely arbitrary distinction that traditionally applies between 'staff' and 'payroll'". With the present atmosphere, as clearly indicated by the General Election result, the distinction is unwarranted, particularly as it is less of pay than of status and recognition. Some progress has certainly been made at I.C.I. as something like 65% of this company's payroll workers are classified as 'staff grade' enjoying security of employment comparable to other members of the staff. Equally important from the psychological viewpoint is 'clocking on'. I.C.I., it is learned, are experimenting in a limited way in foregoing the need for clocking on in some parts of the company. This indeed is a progressive step.

Also important is the question of paying wages of payroll people direct to their private banking accounts, and the operation of I.C.I.'s profit sharing scheme which operates identically for staff and factory people. As Fleck says in his summing-up, "the mere statement of cardinal virtue of team work, however eloquently it is made, is not in itself enough." The means to put it into practice must be added and that is the function of management.

HAILSHAM ON RESEARCH

DURING a press conference in London last week, Lord Hailsham speaking about his new appointment as Lord Privy Seal and Britain's first Minister for Science, indicated that he would tackle such questions as whether the general balance of scientific effort was right or could be better employed. He hoped that the report of an inquiry into management and control of Government financed research would not be long delayed. Begun by the late Sir Claude Gibb and continued by Sir Solly Zuckerman, newly appointed chairman of the Defence Research Policy Committee and vice-chairman of the Advisory Council of Scientific Policy, this report is expected to be "full of meat."

Forging of closer links between Government research institutes and universities is another of Lord Hailsham's hopes. He raises an interesting point here in his belief that the time has come "for the purse-strings of private munificence by industries and industrialists to be opened again for the benefit of universities and colleges." But he does not see why gifts from individuals and institutions should be concentrated on Oxford and Cambridge or even London.

Today, Britain is spending a total of between £350 million and £450 million a year on all research and development, of which something like £80 to £100 million is spent by industry itself. This does not satisfy Lord Hailsham who wants to see both Government and industry spending more and particularly those industries which undertake little research, and seem unwilling to pay for it. The small company has in the past found it difficult to get confidential research undertaken but as Lord Hailsham reminds us, there is the Department of Scientific and Industrial Research which is now prepared to undertake contract research on a confidential basis.

Government, university and industrial scientific organisations, Lord Hailsham criticises as being too parochial or too departmentalised, so affecting the efficiency of U.K. science and the nation's productivity. He looks, therefore, to greater interchange of ideas and personnel and more interlinking of organisations between Government, universities and industrial laboratories. He approves of the German approach whereby all leading scientists in industrial laboratories are extra-mural professors who lecture once or twice a year and are therefore qualified to supervise their juniors for university degrees, and says that U.K. industry must invite the universities into their laboratories, and the universities on their part should accept U.S. and German experience in this respect. To help broaden the universities' scope and activities, industry will have to play its part by giving them more funds and grants.

With the task of promoting science in all the various spheres of life, Lord Hailsham regards himself "as a midwife for the scientists", and his job as creating a piece of political apparatus that will work. He has little direct power in his new office. He can only achieve his aims "by making use of the arts of encouragement, diplomacy, enthusiasm, example, precept or advice". To help him he has under him a combination of the Lord President of the Council's former staff and those people formerly in the Atomic Energy Office. His main advisory team, therefore, will be the Advisory Council for Scientific Policy. Much therefore will rest on the shoulders of this body.

SCHONIGER TECHNIQUE FOR BORON

SCHONIGER'S combustion technique has now been applied to the determination of boron in organic compounds and has proved very satisfactory with both carbon-boron and nitrogen-boron linkages, National Chemical Laboratory's analytical research section report (Report of the N.C.L.—1958).

The method used is to wrap the weighed sample, mixed with powdered caustic potash, in transparent cellulose sheet if the solid is solid and non-volatile; otherwise it is weighed into a gelatine capsule. Combustion is carried out in oxygen, and the products are absorbed in water. The solution is made acid to pH3 and carbon dioxide is removed by bubbling oxygen through the solution as recommended by Jackson and Bailey (*Analyst*, 1954, **79**, 785). The solution is titrated electronically, first to pH 5.5 and then, after the addition of mannitol, to pH 8. The passage of oxygen is continued during the titration.

The Schöninger method has also been applied to the determination of chlorine in volatile liquids. There has been some difficulty, however, in finding a suitable container for holding the sample. The most satisfactory so far has been a capsule made from adhesive transparent cellulose tape lined with filter paper. The capsule has been inserted in a glass bucket while being burnt in the flask filled with oxygen. In one set of experiments ten results on chloroform varied between 84.7 and 90.5%, the average being 87.4%; the calculated value is 89.1%.

National Chemical Laboratory's Report

Radioisotope Development Survey Shows 220 Possible Applications

PROGRESS of the Radioisotope Applications Unit at Harwell is noted in the *Report of the National Chemical Laboratory 1958* (published by the Department of Scientific and Industrial Research and obtainable from H.M.S.O. price 5s 6d net). As a first step a tour was made of all stations of the Department and of Research Associations during which some 220 possible applications were listed. These have been classified into functional types and each member of the permanent staff (six) has been made responsible for applications within a given type group, including relevant technique development. Only a small proportion of the potentially useful work can be undertaken by the unit and some problems have been passed to Isotope Division of A.E.R.E. Staff of the unit is to be increased in the near future by temporary attachments from other stations or research associations. Expansion of the permanent staff will not be possible until new premises near Wantage become available later this year.

Solvent Extraction from Uranium Ore Pulps

Solvents and Uranium Extraction. An interesting possibility which has been studied during the year is that of direct solvent extraction from uranium ore pulps. Once pulp and the organic phase have been thoroughly mixed together, they do not readily disengage, and in the case of the tertiary-amine solvent, in particular, the whole congeals to a slimy mass which can only be separated by centrifugal means; even the amine concentration in kerosine falls. Uranium present in leached pulps, it is reported, may be extracted by a limited contact between the phases, and a disc contact has been designed which makes use of this principle. Pulp and solvent are pumped counter-currently to one another through the disc contactor unit, the discs of which are interleaved with stationary separators to reduce short-circuiting of the solvent and aqueous phases. The discs are wetted by the aqueous phase and, as they rotate, a film of the aqueous solution is carried through the solvent, so effecting transfer of uranium. The solvent used is a 0.1M solution of di (2-ethyl hexyl) hydrogen phosphate in kerosine. The loaded solvent is stripped of uranium in the normal manner. Use of long-chain amines as extractants is found less satisfactory.

Preliminary work has commenced on a multi-stage unit and discs made of Perspex; glass and aminated p.v.c. have been tried. Glass discs have been siliconed in an attempt to produce a water repellent surface wetted by organic solvent but this proved unsuccessful, the partial wetting by both phases leading to very high entrainment. Tests using surface active agents to reduce entrainment have yielded somewhat variable results, but in general there has been no significant reduction in solvent losses.

Thorium Extraction. After preliminary tests with a number of primary alkylamine's a branched chain amine Primene J.M-t was selected for detailed tests. This amine extracts thorium selectively from a solution containing a very large excess of $Fe_2(SO_4)_3$ without previous reduction of the iron to the ferrous state. Also valuable is the fact that the thorium extraction is constant over a wide pH range; normal HNO_3 is a suitable agent for stripping thorium from the loaded solvent. Counter-current extraction tests carried out with synthetic sulphate liquors have indicated that it is possible to recirculate the amine nitrate solvent without any adjustments other than a check on molarity.

Rare Earth Studies. Work on the mixed-loading technique, using ethylenediamine tetraacetic acid (EDTA) and nitrilotriacetic acid (TRILO) has been completed and is to be published. A satisfactory preliminary separation has been obtained for gadolinium-yttrium using a buffered EDTA system. Pure gadolinum can be isolated by repeated elution with EDTA. This separation has been operated on the semi-scale plant.

Soluble Synthetic Aminocarboxylic Acids

With the mixed-loading procedure a limit to the separations obtained with EDTA and TRILO is set by the tendency of the free acid to precipitate at pH values below 3. More promising results have been achieved, it is reported, with some of the soluble synthetic aminocarboxylic acids such as β-hydroxyethylethylenediamine triacetic acid. Free acids form salts with the hydrogen form of the cation-exchange resin, however, but this can be prevented if the ratio of NH_4^+ to H^+ on the development column is not less than 100.

Using EDTA as eluant, quantities of earth's from lutetium to erbium have been isolated in purities exceeding 99.9%. The beneficiation technique (Chemistry Research 1957, p. 19) has been tested on a larger scale using a light-earth concentrate and 0.2M TRILO solution. The concentrate is split into three fractions, each containing two major constituents—Gd-Sm, Nd-Pr, and Pr-La. These fractions have been further treated using the mixed-loading procedure and a 0.1M TRILO eluant. Lanthanum, praseodymium and neodymium have been isolated at a purity of 99%, but the gadolinium-samarium separation is poor.

Pure Elements and Compounds. Certain elements are being prepared in a high state of purity for researches on their properties as semiconductors. Simple acid washing (e.g. HNO_3) and distillation, it is revealed, if carried out with due care, can produce mercury in which the total metallic impurity is less than one part in 10^6.

In the preparation and purification of pure organic materials as standards, and the measurement of their physicochemical constants, the second virial coefficients or organic compounds have been measured at temperatures up to 180°C.

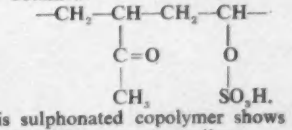
Corrosion of Metals. As much attention as possible is being given to fundamental research into corrosion mechanism. Laboratory investigations have been restarted on the electrochemistry of bacterial corrosion, inhibitors for sulphate-reducing bacteria and on the mechanism of oxidation.

Polymer Membranes for Electrodialytic Cells

Development and Application of New Materials. Arising out of a contract between the Department of Scientific and Industrial Research and the National Research Development Corporation, investigations are in progress on the structure and permeability of polymer membranes for use in electrodialytic cells for separating constituents of solutions, together with basic researches on the ion exchange and allied properties of such membranes.

Ion-Exchange Membranes. A preliminary account was given in *Chemistry Research*, 1957, p. 54, of the development of membranes selective to the passage of ions carrying similar change. The basic concept involved was that interaction of an ion with the polymer matrix of a membrane occurred additionally to the normal coulombic electrostatic interaction (Brit. Pat. Appln. No. 23311/57).

This work has been continued, and a series of anion-exchange membranes, based on p.v.c., containing groups with increasing electron acceptor (i.e. Lewis acid) character have been prepared. A group such as this has been incorporated into a membrane by copolymerising vinyl acetate with methyl vinylketone followed by treatment of the copolymer with concentrated sulphuric acid, when it is considered that groups of the following type are obtained.



This sulphonated copolymer shows high preferential transport of silver.

(To be concluded)

Courtaulds to Expand in Non-textiles in N. America

A FURTHER development in the diversification of Courtaulds' manufacturing interests was announced on Tuesday. Two new companies, Courtaulds North America Inc., New York, and Courtaulds North America Ltd., Montreal, have been formed with the object of exploring and developing opportunities for the expansion of Courtaulds activities in U.S. and Canadian industries outside textiles. The new companies have been formed jointly by Courtaulds Ltd., Courtaulds (Canada) Ltd., and Courtaulds Inc.

The Courtaulds former U.S. subsidiary, American Viscose, was sold during the war and Courtaulds Inc. was established in 1951 to produce rayon staple. Major activities of Courtaulds outside the textile industry include chemicals, packaging, steel tyrecord, plastics, paint and wood pulp. Last year the U.K. subsidiary, Group Developments Ltd., was formed to acquire interests in industries other than textiles.

Chairman of both new companies is Mr. J. Albert Woods, formerly president of Commercial Solvents Corporation, New York, and latterly a consultant to Courtaulds Inc. Mr. Woods is also a director of Central Savings Bank, Corn Products Co., Chemical Corn Exchange Bank, American Smelting and Refining Co. and Wilson and Toomer Fertilizer Co.

President and chief executive officer of both companies is Mr. S. F. Wagdin, who was treasurer of Courtaulds Inc. from 1951 to October 1959. The other directors are C. H. Brock, director of Courtaulds (Canada) Ltd., Dr. J. G. Davoud, a director and executive vice-president of Courtaulds (Canada) Ltd., A. W. Knight, director of Courtaulds Ltd. and of Group Developments Ltd., and C. L. Paine, president of Courtaulds Inc. and of Courtaulds (Alabama) Inc.

'Courtelle' in France

Courtelle, the acrylic fibre developed and manufactured in the U.K. by Courtaulds Ltd., is also to be manufactured near Calais in a new plant which is being built adjacent to the rayon factory of Courtaulds' subsidiary Les Filés de Calais. Production is expected to begin in the early part of 1961.

The plant will be operated by Courtaulds France S.A., a new Courtaulds subsidiary company in which the Prouvost Group of Roubaix (worsted combers and spinners) are also participating.

I.C.I. Carbon Dioxide Sales Double Last Year's Level

SALES of carbon dioxide by I.C.I. Billingham Division are at a rate that is double that of last year declared Mr. W. J. V. Ward, division chairman, last week. He said that prospects were good and he particularly mentioned sales to brewers, mineral water manufacturers, foundries and the Atomic Energy Authority.

The position for methanol had improved after an anxious period caused by cheaper methanol being sold by overseas competitors. Sulphuric acid sales would be lower than those for 1958 and it was expected that urea sales in Canada would be sharply curtailed as a result of the start-up there of an American Cyanamid plant. In spite of this and severe price competition in Europe, Australia and Mexico, exports of urea continued to do well; recently there had been heavy orders because of the dock strike in the eastern and Gulf ports of the U.S.

Record tonnages of C.C.F. and Nitrochalk fertilisers had been booked by I.C.I. agents. In 1958-59 total deliveries of fertilisers by I.C.I., other firms and from imports were a record and showed a rise of 8% over the previous year. The full output of the company's new C.C.F. plant had been sold, but competition from manufacturers was becoming more severe.

Mr. Ward said that I.C.I. had supplied more than 3,000 pages of written evidence in answer to questions put by the Monopolies Commission on chemical fertilisers. He added "We do not know what is in the report. It is, however, of vital interest to I.C.I., because under the terms of the Monopolies and Restrictive Practices Act, I.C.I. has a monopoly in respect of the nitrogen for fertiliser purposes as it controls more than one-third of the total amount supplied in the U.K."

Mekog Gas Reforming Contract for Chemico

A CONTRACT for a gas reform plant to treat natural gas for the production of ammonia synthesis gas has been awarded to Chemical Construction (G.B.) Ltd. by N.V. Maatschappij Tot Exploitatie Van Kooksovengassen (Mekog), Holland.

The plant will reform about 125.000 cu. m. per day of natural gas and is followed by a CO conversion plant producing gas suitable to send to the existing purification and ammonia synthesis plant.

Contractor Appointed for Esso Oil Additives Plant

Contract for the construction of the extension to their oil additives plant at Fawley has just been awarded by Esso Petroleum to Foster Wheeler.

P.G. Krystal Plant for Melamine in Germany

GERMAN licensees of the Chemical Plant Division of P.G. Engineering Ltd., Stockton-on-Tees, one of the Power-Gas Group, have received an order for Krystal crystalliser plant for melamine production. The division is also engineering an ammonium sulphate plant for Turkey.

Various process plants have recently been completed on the Continent. In Germany, a Krystal triple effect plant for the production of 150 tons per day of ammonium sulphate from gypsum liquor has been installed, and a 50 tons per day unit from gas/acid liquors. A Hercules hydrogen plant has been completed for Kali-Chemie A.G.

The General Contracts Division is now undertaking extensive work on two sites of the Atomic Energy Authority. The work includes stainless steel pipework fabrication and erection, with installation of mechanical equipment, etc. The division has also received several orders for fabrication and erection work chemical plant, pipework and pumps. An acetylene plant will be fabricated and erected in three months.

A contract for 'a large chemical concern' that has just been completed involved the erection of more than 100,000 ft. of pipework.

Information on other recent work carried out by the Power-Gas Group, was given in CHEMICAL AGE, 26 Sept., p. 401.

Possibility that Nobel Might Make Acetaldehyde

DISCUSSING I.C.I.'s production of pentaerythritol at a recent staff meeting, Dr. W. A. Caldwell of the company's Nobel Division said that the possibility of the division making its own acetaldehyde had been examined. That might be feasible if new uses for the chemical could be developed, thus establishing a market that would justify the plant expenditure.

Some interesting products were being examined and he mentioned that start-up of the Dumfries methyl cellulose plant would lead to beneficial effects. The product, complementary and in some ways similar to Cellofas B XIIV, would help sales staffs because I.C.I. would be able to offer a more complete range of cellulose ethers. The granulating section of the plant was being commissioned to operate on imported material, but the entire plant would not be in full production until some time next year.

The new isopropyl nitrate plant at Ardeer was in operation and produced starter fuel for jet engines, a limited use. The plant was quite large and the possibility of using a small quantity of the material to upgrade the quality of certain diesel fuels was being examined vigorously. It was hoped that the plant would produce isopropyl nitrate cheaply and that a large market for it would be built up.

Will

Mr. Augustus James Marks, of A. H. Marks and Co. Ltd., chemical manufacturers, Wyke, who died on 16 February, left £52,177 net.

Clean Air Exhibition Made Feature of Electrostatic Precipitation

MODELS of electrostatic precipitation shown by **Lodge Cottrell Ltd.** at the exhibition held in conjunction with the diamond jubilee conference of the National Society for Clean Air at Seymour Hall, London, from 20 to 23 October, covered a wide variety of installations. This company which is now backed by the financial resources of the Simon Engineering Group, manufacture electrofilters of almost every size.

Units already installed for the collection of valuable dust or fumes from a process gas, or alternatively for the removal of impurities from a gas to render it suitable for commercial or industrial use, include alumina and cement dust from kiln gases; sulphuric acid mist; dust from basic slag crushing and grinding plant; tin, copper, lead, silver, gold, selenium, etc., from smelting and refining; reduction of haze and removal of sodium hydroxide from auto-diesel oil; dust and ash from boiler waste gases, etc.

Simon-Carves Ltd., Cheadle Heath, Stockport, illustrated the Fulham-Simon-Carves process for the removal and recovery of sulphur from stack gas. This consists essentially of scrubbing the flue gases with ammonia liquor to produce a solution of ammonium salts which by autoclaving are then converted into ammonium sulphate and sulphur. The economics depend on the size of installation and the percentage of sulphur in the fuel, but where the gases from large tonnages of high sulphur fuels are being treated, estimates show that the process can be operated at a profit.

A Speciality for 30 Years

Simon-Carves have made electro-precipitation one of their specialities for more than 30 years and have installed many hundreds of precipitators, ranging from modest detarrers and demisters to flue-dust precipitators of comparatively massive proportions. Recently the company commissioned the first open-hearth furnace precipitator in the U.K.

The company's recent acquisition of Lodge-Cottrell, the pioneer precipitation company in the U.K. with the resultant pooling of knowledge, should lead to better plants with increased efficiency.

Research work and testing of various devices for collecting grit and dust from coarse particles to those in the sub-micron range, have resulted in the production by **Sturtevant Engineering Co. Ltd.,** Southern House, Cannon Street, London E.C.4, of practically every known type of dust arrester. Efficiencies of dust arrestment up to 99.7% have been recorded for Sturtevant electrostatic precipitators which have been installed in chemical works, etc.

Precipitron electrostatic air filters are said to be treating millions of cubic feet of air per minute for the removal of particulate matter in factories, laboratories, offices, etc. Fleetway paper filters can be used alone or in conjunction with the Precipitron for complete filtration of air, removing particles down to 0.01 micron. Sturtevant scrubbers are available in several types for the wet-arresting of inflammable or explosive dusts.

The Holmes-Schneible multi-wash system, manufactured by **W. C. Holmes and Co. Ltd.,** Turnbridge, Huddersfield, is applicable to a wide range of dust collection and control problems involving liquid and solid particles. With an efficiency of the order of 99% for all particles above 3-4 micron, it is claimed to have a lower pressure drop than many other types of wet washers and an absence of circuit restrictions which might cause blockages.

Built into the multi-wash collector are three established methods of dust collection: tangential entry of the gases into the circular bases of the collector utilises centrifugal force to throw out the heavier particles; dust particles are bombarded by a fine divided self-induced water spray; dirty gases pass over large wetted areas.

The Holmes-Rothemuhle multi-cell cyclone dust collector has been designed to minimise grit emissions from hand, stoker and pulverised fuel-fired boilers. It is suitable for a variety of problems ranging from the removal of fly-ash from boiler flue gases to the recovery of valuable dust and fines from crushing, grinding and drying operations.

James Gordon and Co. Ltd., Dalston Gardens, Stanmore, showed boiler efficiency instruments, including the Mono chemical type CO_2 recorder and Mono portable CO_2 tester, the Elliott thermal conductivity type CO_2 analyser with indicators and recorders, steam meters, temperature indicators and recorders, and the new Konitest dust metering equipment for measuring the dust burden of boiler exit gases and industrial atmospheres.

A working model of a Drummond washer filter, produced by **Drummond Patents Ltd.,** 5 Great Winchester Street, London E.C.2, showed the fan, the only moving part, drawing air through the washer and creating a double wave and heavy spray. The air undergoes an intense scrubbing, although there is no great increase in humidity. Large and small particles are trapped in the water and settle to the bottom if they are heavier than water, or are bled off if they are lighter.

A new method of removing SO_2 from stack gases, shown for the first time by the **Chemical Construction (G.B.) Ltd.,** 9 Henrietta Place, London W.1, was described last week (p. 571). This company also exhibited its range of Chemico gas scrubbers, including venturi types for the removal of sub-micron dust, fumes, mists and other difficult scrubbing jobs. The P.A. venturi principle of operation was shown by an animated panel. Also on view was the new S. F. venturi, which is particularly suitable for removing and eliminating sticky solids from gases; this scrubber permits recycling of heavy slurries and recovery of concentrated process materials from gases.

For less difficult problems, details were provided of the cyclonic scrubber which is effective for removing dusts and liquid aerosols that are plus-micron in size or larger; also on problems requiring an absorption action such as the removal of obnoxious odours and low concentration of corrosive acid fumes.

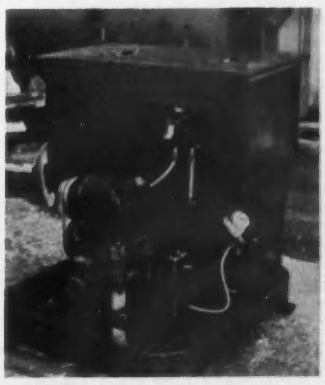
New Chemical Plant Hire Scheme for Test and Experimental Work

A PLANT hire scheme has been introduced by Metering Pumps Ltd., Ealing, to enable experimental chemists and industry in general to carry out experimental work in chemical dosing and to test the effectiveness of new processes in connection with their own specific needs.

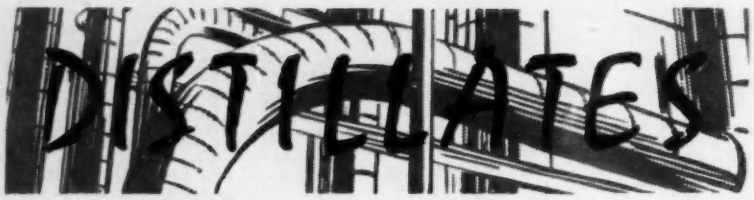
The plant available under this scheme consists of packaged units of an electrically operated variable stroke chemical injection pump, a 20 gall. capacity rubber-lined mild steel solution tank, polythene delivery tubing and an injection fitting. This equipment is mounted on a mild steel frame.

The pump can deliver from 0 to 3.75 gall. per hour against a pressure of up to 200 p.s.i. Six stroke speeds can be selected: 22, 29, 38, 47, 60, and 76 s.p.m. In addition, the length of stroke can be varied from zero to maximum. Materials in contact with the liquid are ebonite, glass, synthetic rubber and polythene.

Hire charges are £4 per week plus transport to and from stores. During hire, service will be carried out free and the company's technical advice service will also be freely available.



One of the packaged units



★ AWARD of the 1959 Nobel Prize for chemistry to Professor Heyrovsky (see p. 609) is not only a just reward for a lifetime's work in developing polarography, but also a timely recognition of the importance of the technique. The Czech instruments, which are extensively used in Eastern Europe, account for about 99% of the polarographic apparatus used in Communist countries; they are available in the U.K. from Nash and Thompson of Tolworth.

So far as this country is concerned, polarography as an analytical tool has only come to the fore the last few years —some 30 years after its discovery by Heyrovsky. Credit for its development here must go to a number of brilliant young researchers with the U.K. Atomic Energy Authority. In some respects their work is ahead of the Czech workers.

Much more is likely to be heard of polarography in the future, particularly as a method of continuous process analysis. A number of companies already have work in hand on this technique.

★ DESPITE recent rain, Cleveland Water Board reservoirs are only a quarter full and there is still a serious need for water economy on Tees-side. To cope with the situation I.C.I. Billingham Division have installed a three-mile long polythene pipeline to take water from Fishburn Colliery to Billingham Beck to supplement the factory supply.

The pipeline can carry 420,000 gall. of water a day. It was laid under two railway lines, under and over roads, round the side of a sewage farm and across fields.

★ MOST of the licensees of the Scientific Design ethylene oxide process agree to make data from full scale operations available to their licensees on a reciprocal basis. This know-how exchange, which is probably unique, is transmitted through S.D., who act as a clearing house. Since each plant differs from the others and each company pursues its own technical developments, each of the manufacturing licensees in the group stands to gain from this exchange.

Last week, 30 delegates representing seven companies in five countries who are licensed to use the S.D. direct air oxidation process for ethylene oxide, met in France and Germany for their second technical conference. They exchanged process information and discussed problems of common interest. At the 1958 conference, General Aniline and Film Corporation acted as hosts at their S.D. ethylene oxide plant in Linden, New Jersey. This year, Naphtachimie acted as hosts at their plant in Lavera, France.

Items discussed were operating procedures, control techniques, catalyst behaviour, corrosion, and the results compiled from operating data submitted to S.D. by the licensees. Apart from touring Naphtachimie's plant at Lavera, delegates also visited ethylene oxide units of Marles-Kuhlmann at Gonfreville, France, and Chemische Fabrik Holten, Oberhausen, Germany.

★ FOLLOWING the news that the Government of Eire had decided to abandon temporarily a project to establish a plant for nitrogenous fertilisers (CHEMICAL AGE, 24 October 1958), I was interested to see the full text of the official statement this week. It seems that the Government was satisfied that the project presented no insuperable technical difficulty and that it would be economically feasible at the prices for imported fertilisers that had previously prevailed.

Reason for the present decision is the fall in prices of imported nitrogenous fertilisers. The following are the prices paid by Irish farmers in recent seasons:

	Sulphate of Ammonia	Ammonium Nitrate
1956-57	£23 5s. 0d.	£23 3s. 4d.
1957-58	£22 3s. 4d.	£22 3s. 4d.
1958-59	£19 16s. 8d.	£19 8s. 4d.

Average prices for the current season have not yet been established, but it seems that they will be below the 1958-59 prices. The project will not be put into operation while these low prices prevail. Planning of the proposed factory will, however, be completed so that the plant can be rapidly set up should it become a sound economic proposition.

★ IT IS a common failing to expect as much as possible in return for as little as possible. Employers are not immune and I wonder how many of my readers spotted a small advertisement in some of the leading newspapers last week. A large company required a translator-abstractor. A sound knowledge of Russian, German and French was essential: and it was indicated that there was scope for other languages.

In addition experience in one or more of the following would be an advantage: agronomy, agricultural and industrial chemicals; pharmaceuticals and chemical engineering. For all this, a salary range starting at £600—up to £900 was offered. Which proves that translating and abstracting are still the cinderella professions so far as some firms are concerned. And yet these are highly skilled jobs calling for a flair for languages and a training in science and technology.

★ I AM delighted to see that one of the few first novels to be published in Canada—and now available from Ernest Benn (15s.) in this country—has been written by a former colleague and editor of this journal, Mr. Arnold Running, who returned to his native Canada in 1955.

The setting for the novel, entitled 'Stay But Till Tomorrow,' is an isolated ranch in the foothills of the Rockies at the onset of winter. Here live a simple, wise old man, his crippled and embittered half-breed grandson and a boastful broken-down cowboy—three brilliantly conceived characters. Drama is introduced by the arrival of a trio of Americans—two men and a woman, ostensibly on a hunting trip but in fact fleeing from the police.

Running's style is lively, yet mature, taut but easy and fluid. This is a book that once picked up, is difficult to lay aside until the final paragraph. Present indications are that it will be a big success.

★ IN recent years there have been a few major setbacks in the commissioning of large chemical plants. This, of course, is no reflection on the companies concerned and such difficulties will inevitably arise in the future. It is, however, always heartening to be able to place on record a smooth start-up when that occurs.

I am, therefore, delighted to say that in commissioning their polythene plant on Southampton Water, Monsanto Chemicals ran up against no major snags. The project came on stream well to time and worked up pretty well as planned. This is quite an achievement, particularly as polythene is not the easiest material to produce.

The £3.25 million plant has been fully commissioned in sections, each of which is a full manufacturing unit. Construction was handled by Matthew Hall to the design and supervision of Monsanto's own engineers.

I can tell readers of this column that this polythene plant is already being expanded. The full rated capacity at present is 10,000 tons per year, but the extent of the expansion is a company secret.

★ A BRITISH firm that has siezed the initiative in dealing with the European Common Market is H. and E. Lintott, of Horsham, makers of process heaters and a member of the Ayling Industries Group. They have now signed an agreement with Born Engineering Co., Tulsa, U.S., for the European manufacture and sale of Born heaters, which throughout the world process more than a million barrels of oil a day.

First contract received since the new association was formed, has come from Monsanto Chemicals. It is for two steam superheaters that will be fabricated and assembled at Horsham before transportation in three sections for erection on site at Grangemouth.

Mr. Harold Born, of the U.S. company arrived here from New York last week and is inspecting Born installations in Europe and Lintott's associates in West Germany and Holland. His father, Dr. S. Born, who heads the U.S. firm, forecast as long ago as 1921 the manufacture of synthetic rubber from a petroleum source.

Alembic

FIRST OF BEECHAM'S NEW PENICILLINS

FIRST fruit of the joint research and development programme announced last March between Beecham Research Laboratories, in Great Britain and Bristol Laboratories Inc., Syracuse, U.S., is a high potency oral penicillin, trade name Broxil (derived from Brockham Park Laboratories, Beecham's research headquarters) for the U.K. and Commonwealth except Canada and Syncillin in the U.S.

Physical and Chemical Properties.—Chemically the potassium salt of 6-(α-phenoxypropionamido) - penicillanic acid, Broxil is the first commercially available synthetic penicillin based on the discovery disclosed in March this year by Beechams, of the basic core of penicillin (CHEMICAL AGE, 14 March, p. 453). It is the N-acylation product of 6-aminopenicillanic acid (6-APA) and α-phenoxy propionic acid (the phenylether of lactic acid). The compound consists of colourless crystals which decompose above 220°C, depending on the mode and rate of heating. It is freely soluble in water and is found to be remarkably resistant to decomposition by acids. The acid stability is stated to be equivalent to that of penicillin V at pH2 and pH3 when tested at temperatures of 5°C and 37°C. The pH of aqueous solutions is in the range of 4 to 7.5. The drug is only moderately hygroscopic, and it is not appreciably affected by air or light.

Two Diastereoisomers

By virtue of the asymmetric carbon atom in the side chain of the molecule Broxil is the first commercially available penicillin known to be a combination of two diastereoisomeric forms. Each of the diastereoisomers has been synthesised in essentially optically pure form and has been found to possess distinctive physical properties. Thus, potassium (D-α-phenoxyethyl) penicillinate (penicillin 152-D) has a specific rotation greater than +250° in aqueous solution whereas the rotation observed for potassium (L-α-phenoxyethyl)-penicillinate (penicillin 152-L) under similar conditions is less than +225°. Penicillin 152-D is appreciably more soluble than pencillin 152-L in a variety of most organic solvents, including certain alcohols and ketones. Definite differences can be observed, Beecham state, in the so-called 'finger-print' region of the infra-red spectrum of the diastereoisomer.

The free acid form of Broxil has been established as the reference standard. The stoichiometric potency of the potassium salt is 905 micrograins per milligram in terms of the reference standard.

Microbiological Properties.—The antimicrobial spectrum of this new penicillin is reported to be essentially the same as that of penicillin V. The drug is highly active against such common pathogens as streptococci, staphylococci, *Diplococcus pneumoniae* and corynebacteria. It is without significant activity against shigella, salmonella and *Escherichia coli* as is the case with penicillin V.

Pharmacology.—When administered orally, Broxil has been found to produce blood levels two to three times greater than those obtained after equivalent oral doses of penicillin V, and at least equal to those following intramuscular doses of penicillin G. It is rapidly absorbed from the gastrointestinal tract and peak serum concentrations are reached within half to one hour, and penicillinaemia usually persists for at least 4 hours. It has been observed that if doses within the 125-250 mg. range are doubled, serum antibiotic activity is approximately doubled as well.

Present Arrangements.— At present, the new penicillin is being imported from Bristol Laboratories, U.S., in bulk and full-scale production in the U.K. is not expected until the end of next year, when Beecham's Worthing plant should be completed. An arrangement for its production with a U.K. pharmaceutical house is being considered by Beecham, Mr. H. G. Lazell, chairman of the Beecham Group, announced on Monday, but no negotiations are being conducted at present. Emergence of the new antibiotic in so short a time has amply justified Beecham's decision to collaborate with a U.S. company, Mr. Lazell reports. Most of the development work on the new penicillin has been done in the U.S., but Mr. Lazell hinted that "it might well be that the next will be largely developed in this country".

Cost of the New Penicillin.—Broxil is the first penicillin to be produced on which a royalty will be paid to the U.K. Previously, all penicillins produced carried royalties to the U.S. Initial cost of the first small amounts of the penicillin was about £5 per gramme, but Beecham's expect that the cost will work out at about 105s per 100 tablets, compared with about 72s per 100 tablets for penicillin V of the same strength.

A simultaneous announcement regarding the new penicillin was made in Syracuse, U.S., on Monday by Dr. P. Bowman, president of Bristol Laboratories.

The new penicillin is to be made available to hospitals and doctors in limited quantities immediately free of charge, and will be used in tablet form for the treatment of pharyngitis, laryngitis, boils and other staphylococcal infections and gonorrhoea.

Czech Polarographer Wins 1959 Nobel Prize for Chemistry

DISCOVERY and development of the polarographic method of analysis by Professor Jaroslav Heyrovsky was recognised this week in Stockholm when the Czech professor was awarded the Nobel Prize for chemistry. The discovery was made in 1922 when he began his polarographic investigations in Czechoslovakia. He completed his first polarographic apparatus in co-operation with the Japanese scientist Shibata in 1925.

Earlier, Heyrovsky had studied in Britain under Sir William Ramsay and Professor F. G. Donnan and from 1913-14 was a demonstrator at University College, London. It was not until the 1930's that his discovery attracted much attention outside his own country; earlier this year the Polarographic Society awarded him their new silver medal for his discovery and the subsequent major contributions that he and his students have made to the subject.

Professor Heyrovsky

Professor Heyrovsky, who is director of the Polarographic Research Institute, Prague was unable to attend the International Congress of Polarography at Cambridge on 24 August, when the medal was to have been presented to him because of ill health. His son received the award on his behalf. (CHEMICAL AGE, 29 August, p. 217.)

The 1959 Nobel Prize for medicine and physiology has been awarded to two U.S. biochemists, Professor Severo Ochoa, College of Medicine, New York University, and Professor Arthur Kornberg, Stanford University, California. Working independently, they were both successful in enzymically synthesising polynucleotides which are closely related to the naturally occurring nucleic acids.

Dr. Emilio Segre and Dr. Owen Chamberlain, both of the University of California, share the prize for physics for their discovery of the antiproton. They played a leading part in separating and identifying particles produced by the Bevatron accelerator at the university.

Nitric Acid by Intermediate Oxidation at New I.C.I. Plant

NEW plant being built at Ardeer by the I.C.I. Nobel Division to produce weak nitric acid (see CHEMICAL AGE, 17 October, p. 529) will use the intermediate oxidation system. This is described as being "of a type that has proved its worth on the Continent". It will replace Ardeer's existing nitric acid plants, two of which are of the Dupont pressure oxidation type, the third being an atmospheric pressure oxidation unit.

The new plant will have greatly improved efficiency as a means of changing ammonia into nitric acid. It will combine the best of two systems. Conversion of ammonia to oxides of nitrogen will be at atmospheric pressure, but when the gases go to the absorption towers they will be at a higher pressure.

A feature of the plant will be low running costs; it will be almost self-sufficient in the matter of energy. The heat released in the process will be used to raise steam which, passed through turbines will operate the plant compressor.

Most prominent feature of the building site at present are three 27-ft. diameter mild steel spheres in which liquefied ammonia from Billingham Division will be stored at a temperature of −30°C. The ammonia reaches the process as a gas and during the change will be used to cool a stream of water that, circulating through another part of the system, will cool the hot gases formed.

The gaseous ammonia will be mixed with washed air and the mixture filtered through small stoneware tubes before it passes to the converters. The three 9 ft. converters will be much larger than those in existing plants. The catalyst will be platinum/rodium gauze.

Beneath each converter there will be a boiler that will use the heat of process gases to raise steam. About 8,000 lb. of steam at 270 p.s.i. will be raised and will operate a turbine driving the 2,000 h.p. stainless steel centrifugal six-stage compressor. This will raise the pressure of the reaction gases to 42 p.s.i.; more heat will be extracted and transformed to power.

After passing through heat exchangers the gases will go to six stainless steel absorption towers, each 60 ft. high and 8 ft. in diameter. Pumps will circulate the acid which, when ready for storage, will be of 60% concentration. The bulk of this acid will feed the division's "new magnesium nitrate type concentration plants".

P.G. to Supply Five Wiggins D.S. Gasholders

ORDERS for five Wiggins dry seal gasholders to be supplied to India have recently been received by member companies of the Power-Gas Group. P. G. Engineering Ltd., Stockton-on-Tees, are to supply one of the Wiggins holders, of 1,500 cu. ft. capacity, to an order by a U.K. firm. This holder will be manufactured in Stockton and shipped to site 'plate small'.

The other four Wiggins holders are part of a contract received by the Power-Gas Corporation Ltd., Bombay, India, for the Indian Atomic Energy Establishment. These holders are being manufactured in India, special items only being supplied from the U.K.

Proabd-Wilton Agreement on Know-how and Trading

UNDER an agreement to pool their technical knowledge and resources in their special field of chemical engineering, Société Proabd of France and Chemical Engineering Wiltons Ltd., a subsidiary of Simon-Carves Ltd., have from 1 October decided to trade in the U.K. and the Commonwealth as Chemical Engineering Wiltons Ltd.

There will be the fullest co-operation between the two companies, from which improvements in plant design may be expected to result.

Proabd (England) Ltd. will cease to operate as soon as their current contracts are completed. The Société Proabd of Nancy, France, will continue to operate in Europe.

New Commercial Department for Shell Chemical

A NEW commercial department has been formed in the Agricultural Division of Shell Chemical Co. as a result of expanding business, which has made it necessary to separate the direction of sales from the formulation of commercial policy. Mr. R. R. Chippindale, formerly head of chemicals section, sales department, is manager of the new department, which will take over from sales department the chemicals and fertiliser sections; it will also be responsible for a new section, marketing services. Mr. C. H. Huddart, continues to be responsible for all field sales. The technical department under Mr. J. L. Hunt is unchanged.

U.K. Chemical Exports Higher by 10%

UNITED KINGDOM exports of chemicals in the first nine months of 1959 were 10% higher than in the same period of last year. The monthly average during this period was £23.7 million, compared with £21.6 million. Exports of products within the chemicals group were as follows:

	Jan.-Sept. 1958	Jan.-Sept. 1959	Percent Rise
	£million—monthly averages		
Chemicals	21.6	23.7	10
Chemical elements and compounds ...	5.1	5.8	14
Pigments, paints, etc.	1.9	2.1	7
Drugs and medicines	3.1	3.3	5
Plastics materials ...	2.5	3.2	26

Imports of chemicals during the first nine months of 1959 were valued at a monthly average of £10.9 million, an increase of 11% over the monthly average of the same period last year.

C.A. 1960 Directory Will List University Chemistry Departments

FOR the first time the *Chemical Age Directory and Who's Who* (1960 edition) will feature a comprehensive list of chemistry and chemical engineering departments in the U.K. universities and colleges of technology. Information listed will include names and addresses of the universities and heads of the various departments concerned. In addition a separate feature will give details of more than 200 technical colleges in the U.K. that provide courses in chemistry and chemical engineering to O.N.C. level or higher.

The Directory, the only one of its kind published for the chemical industry will be distributed free of charge to CHEMICAL AGE subscribers at the end of this year. Charge to non-subscribers will be £3 3s, including postage.

All other features of the 1960 edition have been revised and expanded. The Who's Who will include the names of 1,000 additional personalities in the chemical industry, chemical chemistry and chemical engineering. Additions have been made to the lists of trade associations, Government research establishments, Government Ministries, etc.

The Buyers' Guide Section has been completely revised and will for the first time be published in two parts, the first dealing with chemicals and the second with chemical plant, laboratory apparatus, safety equipment, etc. All firms in these fields have been offered free entries under the appropriate headings.

The Master Directory Index will comprise a comprehensive list of those engaged in the chemicals and related industries.

'Fluidised' Resin Dry Paints

A range of new 'fluidised' powdered resin dry paints which would be applied at temperatures of 200-300°F, by dipping the object to be painted into the paint dust when the resin melted, were described by Mr. F. G. Faulkner, of Imperial Chemical Industries Ltd., when he spoke at the Scientific Instrument Manufacturers' Association's annual conference at Brighton on instruments of the future.

Obituary

Distinguished teacher, historian and interpreter of science, **Dr. Eric John Holmyard** died at Clevedon on 13 October. He will be remembered in particular for the many textbooks he wrote on science, his work as science editor for *Everyman's Encyclopaedia* and as joint editor of the five volume *History of Technology*, the result of collaboration between Imperial Chemical Industries Ltd., and the Clarendon Press, Oxford. Dr. Holmyard was also the first editor of *Endeavour*.

3,300 Miles of Polythene Water Mains but Only a Few Miles in P.V.C.

Water Research Association's Annual Report

IN the five-year programme laid down by the Water Research Association, it is noted that besides expansion of the existing programme it contains additional topics embracing investigations into filtration, waterworks sludge reclamation and disposal, algal control, hydrology and bacteriological and chemical analysis. The association's information and advisory services are to be extended and, with an expansion of research staff, its liaison work should be much increased.

Reference is made by the director of Research in the fourth report of the association just released of an expenditure of £25,000 during the year on investigations into water treatment, leak detection and the application of plastics materials to water distribution.

Chemical Coagulation Processes. Work on the research division's main activity, chemical coagulation process of water treatment, has continued and has concentrated on the use of coagulation for the removal of turbidity. There are indications that optimum conditions for this are not the same as those required for colour removal. Results obtained so far suggest that the coagulation process is independent of the nature of turbidity present as colloidal clay minerals associated with organic materials. Bentonite provides an exception, but this clay is not often found in large quantities in British rivers.

Clay Minerals

Previous work by the association dealt with the effect of pH on coagulation of dilute colloidal dispersions of nine pure clay minerals. These investigations had indicated that with the exception of the bentonites the behaviour of clays was similar, the main characteristic being that the quantity of aluminium sulphate necessary to bring about coagulation is at a minimum when the pH of the medium is in the region of 6.8 to 7.5. In contrast, the bentonites can be coagulated with low doses of aluminium sulphate at all pH values below 7.5. Ferric chloride as coagulant is effective over a much wider pH range than aluminium sulphate and the quantity necessary to bring about coagulation is at a minimum between 5.5 and 8.7 pH. With bentonite suspensions, low doses of ferric chloride bring about coagulation at all pH values below 9.2.

A marked difference has been found between the behaviour of concentrated and dilute dispersions. Concentrated clay dispersions invariably flocculate without the addition of any coagulants at acid pH values and the final turbidity varies directly with the original turbidity. Addition of a coagulant at first improves coagulation and then inhibits it, the coagulation curve of final turbidity against dose passing first through a minimum and then through a maximum. The effect of increasing the pH is to cause the maximum to shift to low doses of aluminium sulphate. The influence of salts suggests the phenomenon is due to charge reversal on the colloid.

Effect of Dissolved Salts. It has been found that monovalent ions have relatively little effect, divalent anions such as SO_4^{--} shift the region of minimum coagulant requirement to lower pH values, whereas divalent cations such as Ca^{++} extend the range slightly to higher pH values. Orthophosphate, it is stated, has an appreciably greater effect than the sulphate ion and hexametaphosphate has a discernible effect at concentrations as low as 1 p.p.m. The phosphate material present in domestic detergents behaves in an identical manner to hexametaphosphate.

Silica Gel

Activated Silica. A comprehensive investigation of the effect of various factors in the preparation of activated silica has been started. Work to date shows that neither the ageing time nor the activity of a given silica sol is dependent in anyway upon its gelation time. It has been observed that, for any given activating agent, conditions can be defined for the direct production of a highly active sol without need of terminal dilution and with no practical risk of gelation. It is anticipated that this work will lead to a rationalisation of the optimum conditions required by various activating agents.

Determination of Aluminium. It had previously been found that the fluoride ion interfered considerably with the absorptiometric determination of aluminium in water. Pretreatment is effective but laborious. Further experiments have shown that the fluoride ion is only weakly absorbed on to the anion, while cation exchange resins, although they remove the aluminium readily, do not allow quantitative recovery except by the use of phosphoric acid which itself interferes.

Plastics Pipes. Various polyvinyl chloride pipe samples known to contain lead stabilisers have been examined following the recommendations of the Dutch K.I.W.A. specification. In all cases the quantity of lead leached out by water containing 150 p.p.m. of free carbon dioxide was well below the Dutch specification requirement. A solution containing 150 p.p.m CO_2 is extremely unstable and experiments show that a standard test involving the use of dilute acetic acid would be more satisfactory.

Experiments on the permeability of polythene, p.v.c. and nylon pipes to coal gas have been concluded. Only polythene was found permeable to the gas within the eight month period. The extent of gas contamination of the soil surrounding a gas leak in the ground depends on such factors as the porosity of the soil, the size of the leak and the nature of overlying structures. The nearest safe distance between a polythene water pipe and a potential source of a coal gas leak will depend on these factors and upon the lowest concentration of gas that is capable of diffusing through polythene in detectable quantities. In a series of experiments in which samples of polythene pipe were surrounded by various dilutions of coal gas in nitrogen, it was shown that in mixtures containing between 0.1 and 100% coal gas, penetration of the polythene eventually took place in each case although the rate was considerably affected by the gas concentration.

P.v.c. Mains. Sixteen installations of p.v.c. mains in the U.K. are now known to the W.R.A. Technology Division. These vary from an experimental service connection to a five-mile scheme of 3 in. and 4 in. mains and a half-mile scheme of 6 in. main. As yet there is no British Standard on which to base an assessment of pipe wall thickness. Results will be recorded of tests on sample lengths and joints from these mains, for comparison with samples after several years of service.

High Pressure Polythene. Generally the results of the use of high pressure polythene have been satisfactory, the largest single cause of failure being at joints. The estimated length so far installed for cold water services is 3,300 miles. Only 5% of this tube has been installed above ground, Dutch water undertakings have installed in Holland some 350 miles of polythene since 1945. However, 300 miles of p.v.c. mains and 2,000 miles of p.v.c. services are in use.

A New British-made Super-sulphated Cement

THE first British-made super-sulphated cement is now being produced by Frodingham Cement Company, Brigg Road, Scunthorpe, from a granulated slag of unusually consistent composition, from the works of Appleby Frodingham Steel Co. (a branch of United Steel Companies Ltd.). It is claimed that this slag gives a cement of extremely dependable quality and performance.

Frodingham Super-Sulphated Cement hardens at about the same rate as Portland cement and has a high resistance to sulphates, sea-water, oils, fats and dilute acids.

Literature and prices are available from Lafarge Aluminous Cement Co. Ltd., makers of Ciment Fondu, aluminous cement, 73 Brook Street, London W.1, who have been appointed main distributors for this new cement.

Oscillation-grinding Processes for Graft Polymerisation and Polymer Decomposition

TWO new chemical processes based on oscillation grinding have been reported in detail by East German chemists (*Chemische Technik*, July 1959). Both processes are the result of investigations by Hans Grohn and Klaus Bischof, both of whom belong to the Institute for the Chemistry and Technology of High Polymers, which is part of the Lenna-Merseburg College of Chemistry. In the first report, entitled "Preparation of a mass or graft polymer from polymethacrylate-methyl ester and vinyl chloride by oscillation grinding", it is indicated that in the case of co-polymers produced chemically from two monomers, A and B, the fundamental units are distributed into chain molecules. A mechanical-chemical process, however, permits the linking or 'grafting' of whole blocks—AAAAA and BBBBB— to form block polymers—AAAAABBBBB—with new, valuable properties. Grohn and Bischof deal particularly with the polymethacrylatemethyl-ester (orPMME)/vinyl chloride system.

PMME may be decomposed mechanically, it is reported, by oscillation grinding, during which decomposition process macroradicals are formed. These macroradicals are able, during the oscillation grinding process, to act as initiator, e.g. to polymerise, to the gaseous vinyl chloride present. It is therefore possible to graft a p.v.c.-chain on to mechanically-formed PMME macroradials so as to form a block copolymer.

Oscillator Grinder

For work carried out on this in East Germany, a 'vibratom' oscillation grinder was used to grind 20 grammes of pre-dried, initiator-free PMME (K-val : 120) with 7 kilogrammes of steel shot in a 16-hour process in V2A steel containers to which, after air exchange, vinyl chloride at 0.5 atmospheres had been introduced. After eight hours' grinding a limited vacuum had already formed in the container. This rose in degree as grinding continued. The ground product was then treated in a vacuum drying oven for eight hours at ~50°C to isolate any vinyl chloride which might have been adsorbed.

Quantitative determination of chlorine (after Wurzschmitt) was carried out potentiometrically. Results for the block polymers were as follows:

Test material	Duration of grinding (hours)	Chlorine content (%)	P.V.C.—content (%)
PVC	—	54-55	100
033	4	8.5	14.9
035	8	16.6	29.2
036	16	26.1	46.0

Dissolving tests carried out on the grinding products proved the existence of a block polymer. All products were easily and completely dissolved in benzole, whereas had homo-polymeric p.v.c. been formed alongside the PMME, it would not have dissolved in benzole.

IR-spectra were made of all tests which indicated clearly the formation of a block copolymer (graft polymer).

In a second report entitled "Mechanical decomposition of polyacrylonitrile by oscillation grinding" the East German workers carried out tests at the East German synthetic rubber plant, VEB Chemische Werke Buna. The report runs as follows:

Fifteen grammes of air-dried polyacrylonitrile, or PAN, were ground together with four kilogrammes of porcelain shot in porcelain containers for up to 135 hours with a constant milling rate and amplitude and in the presence of air in a vibratom oscillation grinder.

The degree of decomposition was measured by viscosity counts of 0.1-0.2% solutions in dimethylformamide at 20°C. K-values were determined as follows: untreated, 113.5; after two hours' air grinding, 96.2; four hours, 90.4; seven hours, 85.6; 20 hours, 48.5; and 135 hours, 30.3. These results show a definite decomposition of the polymer which, under the given grinding conditions, aims towards a limit—a 'grindability' limit—after 100 hours. Decomposition may be so planned as to obtain specific K-values, a very important consideration, since varying K-values mean varying chemical and physical properties.

It has been proved, state Grohn and Bischof, by M. Pike and W. F. Watson (*J. Polymer, Science*, **19**, 1 [1956], N. K. Baramboim (*Russian Journal of Physical Chemistry*, **32**, 806 [1958] and their own previous experiments (*Plaste und Kautschuk*, as yet published) that the mechanical decomposition of carbon-chain polymers takes place during the formation of macroradicals. As oxygen is well known as a good radical acceptor, tests were attempted in the presence of lamp nitrogen instead of air; as was expected, K-values were higher than in the original experiments.

Finally, the macroradicals formed during the mechanical decomposition of PAN are able to polymerise on to other gaseous or liquid monomers during grinding, so that graft/mass polymers may be formed.

Aromatic Solvents for Industry

DETAILS of Esso Petroleum Co.'s aromatic solvents, Solvesso 100 and 150 are given in a booklet 'Solvesso Aromatic Solvents for Industry.' These solvents consist mainly of single aromatic rings with various side chains or alkyl groups attached. Double ring aromatic compounds, such as indan and naphthalene, which are even more potent solvents than the single ring type, are present but in concentrations usually less than about 5% for any one compound. There are also small amounts of paraffins and naphthenes in the solvents but these low solvency hydrocarbons, being relatively low boiling, appear most in the *front end*. This means that with Solvesso 100 per cent and 150 the *back end*, that portion of the solvent contributing to the final set and gloss of the film, is essentially pure aromatic in nature.

Chemical Structures. Solvesso 100 has over 90% of aromatic hydrocarbons concentrated in the C_9 series, which are mainly methyl ethyl—and tri-methyl benzenes and about 85% of the 12% to be distilled (and hence to evaporate from coatings) is composed of the relatively high boiling C_9 compounds of 1, 2, 3-trimethyl benzene and indan. Solvesso 150 shows aromatic hydrocarbons mainly in the C_{10} and C_{11} ranges like mixed dimethyl ethyl- and tetramethyl benzenes and mixed alkyl benzenes respectively. There is also a relatively large percentage of methyl indan and C_{11} naphthalenes in the *back end*.

Solvent Power. As classified by the Kauri-Butanol value test (which measures the power of solvency by evaluating the ability of a solvent to dissolve Kauri gum under specific conditions, Solvesso 100 and 150 show excellent solvent power. The KB number of Solvesso 100 is 91 and for Solvesso 150 it is 90. These solvents, Esso state, can carry a high solids content, produce thick films with the minimum number of coats, dissolve high quality resins with minimum viscosity build up.

Blending and Drying. With an evaporation rate about equal to Esso white spirit 100, Solvesso 100 can be blended with white spirit. Solvesso 150 has a slower evaporation rate than white spirit 100 but faster than kerosene and can blend with Solvesso 100 to produce any desired evaporation rate without loss of solvent power and without a pronounced increase in resin viscosity. Both Solvesso 100 and 150 can be blended with aliphatic solvents and with selected aliphates to produce an aromatic tail.

Toxicity etc. The presence of side chains on the benzene ring of the Solvesso solvents, eliminates the bone marrow toxicity of benzene. Esso also state that Solvesso 100 and 150 are no more toxic than toluol and xylol. (Maximum concentration in air for an eight-hour day according to the American Standards Association—200 p.p.m.).

A low bromine number and non-volatile content is found for both solvents. They will not interfere with reactive pigments or resins.

Applications. By far the largest outlet for the Solvesso solvents is stated to be in varnishes, in particular, the short oil varnishes.

Solvent systems associated with the alkyds apply to the maleic alkyds, with emphasis on the use of high aromatics such as the Solvesso solvents, while for urea and melamine alkyd enamels, these solvents are claimed to have proved to be ideal as their evaporation rates fall into the various baking schedules.

Beckton Has Largest Installation of Tower Box Purifiers in U.K.

LARGEST installation of tower box purifiers in the U.K. is now in operation at North Thames Gas Board's Beckton Works. The first five of the 15 towers were started up at the end of September.

Valuable economies in space and in man hours of operation will result from this new unit which replaces the 80-year-old ground level box purifiers previously in use.

Covering only about a quarter of the ground space of the old purification plant, this Balfour-Lecocq installation consists of 15 towers in three streams of five, each stream capable of purifying 10 million cu. ft. of gas a day. The whole unit has a design capacity of 300 million cu. ft. a day.

Gas is brought in by a common inlet, divided into streams, and re-united after purification for removal by a 48-in. overhead main. Each tower is packed with 16 trays, each tray carrying 25 to 30 tons of bog ore/oxide mixture, making a charge of over 400 tons in a tower, or more than 2,000 tons for a stream.

To deal with these large quantities of material in the operation of discharging and recharging of towers, a complete mechanical handling plant is provided as an integral part of the installation. Each tray can be lifted from its tower, emptied and re-charged within an hour. Two stocking towers for the storage of full or empty trays facilitate tray movement during discharging and recharging operations.

Mechanical Handling

Mechanical handling plant comprises a large 55-ton overhead crane (with duplicate standby), a tray tippler, oxide crushing plant and a conveyor belt tray loading system.

In the operation of the purification process the backward rotation system of changing the tower sequence is the normal practice at Beckton, and to enable this 'swinging' operation to be done as frequently as is considered desirable, the necessary valves to each tower are power-operated by an oil hydraulic system and are virtually push-button controlled.

Provision has been made for by-passing or 'jumping' bridle connections and valves to allow for 4-tower rotation during the periods when a tower is out of stream for discharging and recharging.

Safe isolation of any tower is ensured by water valves on each tower inlet and outlet gas connection, and a built-in purging system with a 25,000 cu. ft./hr. inert gas machine covers with safety the withdrawal from or return to stream of a tower.

Basic operation of the plant requires only four men and it is estimated that normal discharging and recharging of a tower will be a 16 man/day job, compared with the 36 man/days required for its equivalent under the old system. Hard manual labour is also virtually eliminated.

List of Contractors

Principal contractors for the installation were Henry Balfour & Co. Ltd., with the following sub-contractors: Stothert & Pitt, Ltd. (cranes), Strachan & Henshaw (tray tippler), William Wadsworth & Sons, Ltd. (lift), Robert Cort & Son, Ltd. (gas valves), W. C. Holmes & Co., Ltd. (purging machines), Kirby Maclean Ltd. (painting), Crossley Bros. Ltd (timber grids), Freeman & Morrison, Ltd. (aluminium sheeting).

Other principal contractors were: foundations, Peter Lind & Co., Ltd.; machinery house, W. and C. French, Ltd.; gas main trestles, Concrete Piling Ltd.; gas inlet and outlet mains, Samuel Cutler & Sons, Ltd.; gas heaters, Newton Chambers & Co., Ltd.; gas meters, W. C. Holmes & Co., Ltd.; oxide handling plant, W. J. Jenkins & Co., Ltd. (Sub-contractors: primary crushers, British Jeffrey Diamond Ltd.; disintegrator, Crone and Taylor, Ltd.); Electrical installation, London Electricity Board; motor control panel, Allen West and Co., Ltd.; steam and water connections, Shaw-Petrie Ltd.; oxygen recorders, Geo. Kent Ltd.; railway track materials, Thomas Summerson & Sons, Ltd.; wagon capstans, Sadi Engineering Co. Ltd.

Construction Progress at S.G.B.'s Fife Lurgi Gasification Plant

Site clearance at the £6 million Lurgi gasification plant for the Scottish Gas Board, at Westfield, Fife (CHEMICAL AGE 24 October, p. 569), began in July 1958 with construction of an access road. In October of last year site clearance proper began. In March this year piling was begun for the Benfield plant and the oxygen plant building, and for the benzole absorbers in May. Foundations for Lurgi House I were laid in April 1959.

Tower construction on the Benfield plant started with the arrival at the site at the end of June last, of the first half of the first tower. By August the first tower had been erected and on the 8, 20 and 29 of September the second, third and fourth towers respectively were placed in position.

Steelwork was started for Lurgi House I in July and by 9 September the first Lurgi gasifier had arrived and was erected by the following day. On 8 October the second Lurgi gasifier was placed in position. The first benzole absorber was placed in position on 30 July, and the second by 11 August.

Main contractors for S.G.B. on this plant are Humphreys and Glasgow Ltd. They have been responsible for placing orders with sub-contractors for the more important items of plant and equipment and civil engineering contracts. The main sub-contractors are:

Babcock & Wilcox Ltd. of Renfrew—main steam raising boilers, two 45,000 lb./hr. by-drum water tube boilers, based on a recent French development for firing poor quality coal, which is known as the Ignifluid system. Fabrication of two Benfield regenerators, which are 110 ft. and weigh 57 tons.

British Oxygen Linde Ltd.—Two-stream plant to produce a total of 200 tons of oxygen/day; a liquid oxygen storage tank containing 500 tons liquid oxygen which is capable of maintaining the plant in full production for four days.

Brush Electrical Engineering Co. Ltd.—Switch gear and transformers.

Drydon Construction Co.—Reinforced concrete set of foundations for the oxygen plant and cladding of this building when steelwork completed; and foundations for the main boiler plant, chimney, and coal handling plant.

Robert Cort and Sons Ltd.—Scalping and main Cort-Krupp screens for the screening house, designed for two separate streams of screening plant, each stream capable of receiving 90 tons/hr. of unwashed, ungraded coal.

Cranes Ltd.—Majority of M.S. valves.

Crowley Russell—¼ million gall. reservoir and site clearance and boiler house building.

George Ellison Ltd.—415 volt switch gear and low voltage switch gear for the substations.

Film Cooling Towers (1925) Ltd.—Water cooling towers and a four-cell tower capable of cooling all the process cooling water (190,000 gall./hr. from 99°F to 68°F).

Firth Blakeley Son and Co. Ltd.—Larger tanks, including 50,000 cu. ft. relief holder taking let down gas from Lurgi plant.

Fisher Governor and Co. Ltd.—Pneumatically controlled valves, actuated by automatic controllers.

Fram Reinforced Concrete Co. Ltd.—Foundations for Lurgi and Benfield plants and the by-products area.

G. A. Harvey Ltd.—Main Benfield absorber vessels; 108 ft. 7 in. tall and weight some 90 tons unladen; normal working pressure will be 345 p.s.i.g.

Hayward Tyler and Co. Ltd.—Main and split stream carbonate pumps on the Benfield plant for recirculating hot potassium carbonate solution. The larger capacity 600 gall./min. at approx. 400 p.s.i.g.

Honeywell Controls—Distant reading temperature recorders and indicators.

Lurgi Gesellschaft fur Warmetechnik, M.b.H., of Frankfurt-am-Main, Germany—First three Lurgi gasifiers and associated equipment. Each gasifier shell weighs 50 tons and is constructed with a double shell designed to keep the main outer pressure shell cool.

M. & C. Switchgear Ltd.—Motor control boards for most motors at Westfield.

National Gas and Oil Engine Co. Ltd.—Diesel alternator set of 606 b.h.p. which will supply 420 kW at 415 volts, to provide emergency power.

Newton, Chambers and Co. Ltd.—Oxide purification plant, ammonia liquor concentration plant and a number of heat exchangers. The installation of high pressure tower purification will be the first in Great Britain and will be in two parallel streams, each stream being of sufficient capacity to purify the total amount of gas, while the other stream is off line.

Bruce Peebles of Edinburgh—Electric motors from 1 h.p. up to 1,800 h.p. and number around 250.

Power-Gas Corp.—Heat exchangers and waste heat boilers in the Lurgi plant, of special design to deal with the large tar burden in the gas. Normal working pressure approximately 350 p.s.i.g. Each waste heat boiler weighs approx. 30 tons and a heating surface of 3,200 sq. ft. They are of the vertical construction floating head type.

Redpath Brown and Co. Ltd.—Steelwork for the main boiler house.

Simon-Carves Ltd.—Waste gas disposal plant. This plant (in two units) oxidises foul gas from the Benfield CO_2 and H_2S removal plant, and is designed for addition of another unit to recover sulphur from the waste gases.

Stanton Ironworks Co. Ltd.—With a few exceptions all the underground cast iron piping.

Stewart and Lloyds Ltd.—Most of the carbon steel pipe.

Taylor Controls Ltd.—Automatic controllers and recorders together with a number of transmitters and receivers, based on the pneumatic system.

John Thompson-Kennicott Ltd.—De-aerators which comply with the specific requirements of the Lurgi plant boilers and the high pressure boiler.

Joseph Webb and Sons Ltd.—Steelwork for the oxygen plant building and Lurgi house.

Wellington Tube Co. Ltd.—A number of heat exchangers, including large aluminium air-cooled exchangers on the Benfield plant, first of this type in the U.K.

1960 Weed Control Conference

The British Weed Control Council is to hold a conference at the Grand Hotel, Brighton, from 7 to 10 November. All enquiries should be addressed to the Secretary, Weed Control Conference Committee, 52 Bedford Row, London W.C.1.

Advantages of Using More Coal as a Source for Chemicals

RESULTS of coal research and their possible fields of application were considered by Sir Eric Rideal, F.R.S., Fellow of Trinity Hall, Cambridge, when he delivered the Eighth Coal Science Lecture last week at the Institution of Civil Engineers. The lecture embodied the thoughts of a distinguished chemist having lifelong experience of surface and colloidal phenomena. At some stage in their history, the colloidal portions of coal must have undergone phase inversion, from an aqueous emulsion to a 'grease' in which the continuous phase is a solid, said Sir Eric. The progressive aromatisation during maturing seemed to imply intramolecular mobility, at least in the earlier stages.

Structure of coal on an atomic scale, and the porosity that partly resulted from the irregular arrangement of molecules was then discussed. He suggested the ready elimination of hydrogen from coal by treatment with 50% aqueous sulphuric acid, and other examples of fairly complete chemical reaction, supported the gel theory of coal structure. He also made brief reference to complete gasification of coal and the study of slags, the possibility of using surplus coal in conjunction with oil as colloidal fuel, and the possibility of reducing the cost of pulverised fuel.

In an interesting final section the possibility of making chemicals directly from coal was considered by Sir Eric who suggested that the advantage of basing chemical industry more fully on indigenous raw materials might justify special methods of costing coal for this purpose. He thought that the quantities of coal potentially required for this purpose need not be regarded as negligible. Furthermore, there were the possibilities inherent in the Fischer-Tropsch and similar processes. Selective hydrogenation offered yet another approach, and the work of Bergius on hydrogen from the reaction of superheated steam with coal was mentioned. Other ideas broached were: use of the carbon ring systems in coals as hydrogen carriers in hydrogen transfer reactions, during the first stage of hydrogenation; enriching the oil vehicle, used in coal hydrogenation, by aromatics to act as hydrogen carriers for the same stage; use of ring fission (at higher temperatures), i.e. first adding peripheral hydrogen to destroy resonance energy, then opening some of the rings to form chains, and finally freeing the chains. It was suggested that search for a catalyst to facilitate the difficult ring-opening process might be rewarding.

Effect of Phosphorus in Grey Cast Iron

WORK during the year ended 30 June in the analytical research section of the British Cast Iron Research Association has included the development of a rapid method for determination of magnesium in nodular cast iron, the examination of the combustion sulphur method using radiochemical techniques (in conjunction with Wolverhampton Technical College) and a method for determining cobalt.

Much attention has been paid by B.C.I.R.A. to instrumentation and improvements have been made to their cathode-ray polarograph and spectrophotometers and a recording flame spectrophotometer has been constructed.

In slag analysis, work has continued on a volumetric method for silica and on a rapid gravimetric method. With regard to spectrographic analysis of slags, the objective is to establish a technique suitable for routine use. A series of synthetic slag samples has been made from pure oxides and used as calibration standards to test various techniques. Work has been undertaken also to obtain standard compositions of nodular iron for spectrographic analysis. Spectrographic analysis of trace elements is undergoing re-examination, to enable the standardisation of spectrographic methods to be brought up to date.

High Chromium Irons. The influence of melting and casting conditions and of titanium and nitrogen additions on the grain size of 30% chromium irons has been studied and the relative importance of the different factors determined.

Graphite Formation. A study of the nature of eutectic cells has shown that within a eutectic cell the graphite flakes are inter-connected and constitute a zone of weakness. An improvement in strength is generally given by increasing the eutectic cell number. Phosphide eutectic has been shown to exist as interconnected filaments, even at around 0.4% phosphorus.

New evidence has been obtained to show that undercooled graphite originates by direct solidification and not in a first-formed carbide. Investigations of the melting points of the grey and white iron eutectics show that at a suitable heat-treatment, the white iron eutectic may melt and re-solidify as a grey iron eutectic. Only under these conditions, it is reported, can heat-treatment of white irons yield normal flake graphite.

Mechanical Properties of Cast Iron. Research initiated to study the effect of phosphorus in grey cast iron up to 1.0% with a range of silicon contents in inoculated and uninoculated irons has been completed. Phosphorus has been found to increase tensile strength up to about 0.8%, regardless of whether the phosphorus was increased in the charges or as a late addition. This increase is associated with an increase in eutectic cell number with increasing phosphorus content.

Plastics Coating for Strip Steel Shown at Düsseldorf Fair

A NOVEL form of coating strip steel with a plastics 'skin' made its first public appearance at the International Plastics Fair which was held in Düsseldorf. The product, Platal, is made by the Hoescht concern, with polyvinyl chloride provided by Chemische Werke Hüls. The makers claim that their method of applying this plastics material in liquid form and in a continuous rolling process is cheaper than the methods used in the U.S. which consists of applying the plastics in the shape of foil.

Hoescht at present can make about 1,000 tons of Platal a month and will extend this to about 4,000 tons by mid-1960.

The material costs from 30% to 150% more per sq. ft. than ordinary steel sheet, depending on the thickness and finish of the plastics skin. A similar product with the plastics applied in the form of foil is coming on to the British market manufactured by Ductilplant and John Summers.

Platal can be delivered in a variety of colours and surface finishes. The plastics material can be applied on one or both sides of the steel and the finished material can be shaped without destroying the bond between steel and plastic. Welding is possible only where the plastics is not applied to both sides.

Large New Packaged Boiler Installation

FOLLOWING their recent work in providing boilers for the nitrogen factory of Fisons Ltd. at Stanford-le-Hope, Essex, G.W.B. Furnaces Ltd., Dudley, Worcs, now announce that they will be supplying what is probably the largest packaged boiler plant to be installed in the U.K.

The contract has arisen as a result of the modernisation and concentration plans of Henry Wiggin and Co. Ltd., centred around their new factory at Hereford. Consulting engineers for the contract are W. C. Atkins and Partners, London.

The installation will consist of five model 600 Powermaster packaged automatic oil-fired boilers, capable of producing from 4,000-104,000 lb. steam per hour at efficiencies of over 80%. Using oil of 3,500 secs. Redwood No. 1 or C.T.F.200, the Powermasters will be used to provide space and process heating. Installation of the boilers will start early next year.

ILMAC To Be Held in Switzerland

ILMAC—the International Congress and Exhibition of Laboratory, Measurement and Automation Techniques in Chemistry—is being held in Basle, Switzerland, from 10 to 15 November. Of the 273 exhibitors 121 are from countries such as Great Britain, France, Germany, Austria, Belgium, Denmark, Holland, Italy, Sweden and the U.S. More than 500 enrolments from 11 countries have been received for the congress.

Overseas News

£11 M. SYNTHETIC RUBBER PROJECT IN INDIA WILL HAVE FIRESTONE TIRE'S ASSISTANCE

WITH the technical and financial collaboration of Firestone Tire and Rubber of the U.S., a Rs. 150 m. (Rs.13.4 = £1) synthetic rubber plant, the first of its kind in India, is to be set up at Bareilly in Uttah Pradesh by the Bombay company, Kilachand Devchand.

Capital cost is estimated at Rs.135 million, excluding working capital. The foreign exchange requirements will be about Rs.75 million, of which Firestone will put in Rs.30 million. The balance will be covered mostly by U.S. commercial banks and investment houses in Britain. Arrangements have been made with commercial banks in the U.S. and financial institutions in the U.K. for the entire amount of foreign exchange requirements. The Government of India has granted the necessary licence under the Industries Development and Regulation Act.

Initial capacity of the plant will be 20,000 tons a year of GRS rubber, lattices and other rubber products. Later capacity will be expanded to 30,000 tons a year.

Also envisaged is the setting up of two other plants, one for styrene monomer with a capacity of 9,000 tons a year and the other for butadiene with a 22,500 tons yearly capacity.

The main plant is expected to go into production in about 30 months.

A.E. & C.I. Study New Fertiliser Project for Rhodesia

A project study for a new nitrogenous fertiliser plant in Rhodesia, which may cost some £9 million, is being carried out by African Explosives and Chemical Industries, jointly owned by Imperial Chemical Industries and De Beers Industrial Corporation. The scheme is reported to be still in its early stages. No plant site has yet been chosen.

Deutsche Erdöl to Raise Petrochemical Capacities

The Hamburg oil company Deutsche Erdöl AG. are to extend the capacity of petrochemical units at present working at their Heide, North Germany, refinery. This increase in petrochemicals production will occur at the same time as the increase of the Heide crude oil throughput to 2,500,000 tonnes annually and the build-up of crude oil exploitation in the Schleswig-Holstein area to well over the present annual level of 225,000 tonnes.

New Dutch Phenol Plant

N.V. Kon. Zwaavelzuurfabrieken v/h Ketjen, Amsterdam, are to build a new plant for the manufacture of phenol. Initial capacity will be based on the organisation's own consumption of 2,000-3,000 tons a year, but as it is hoped to meet the country's entire phenol consumption in the future, provision is to be made for a doubling, or trebling, of capacity. Costs, estimated at Fl.10 million (£943,000), are to be financed from own resources.

Zieren Phthalic Anhydride Plant for Italy

The Co'ogne firm of Chemiebau Dr. A. Zieren GmbH, who recently announced ('Overseas News', 19 September, p. 349) the supplying of a phthalic anhydride plant to Yugoslavia, now state that they have received a similar order from a North Italian concern for a unit with a 150-tonne monthly capacity. The plant will work to the production process of Chemische Fabrik von der Heyden. Zieren supplied a phthalic anhydride plant, of 100 tonnes monthly capacity, to the same customer about a year ago.

Border Chemical to Build Sulphuric Acid Plant

An offering of 75,000 common shares of Border Chemical Co. Ltd., is being made by Davidson and Co., Toronto, at a price of $3.10 a share. Border Chemical were incorporated last June. Funds from the issue are to be used to build a sulphuric acid plant at Winnipeg, Manitoba, at an estimated cost of $550,000. The plant will have a rated capacity of 50 tons of acid a day and will be built according to a design of Chemical Construction Co., New York.

Initially the plant will manufacture sulphuric acid through direct burning of sulphur but ultimately it is planned that supplies of sulphur dioxide will be supplemented or obtained solely through the roasting of sulphur concentrates to be produced by New Manitoba Mining and Smelting Co. Ltd.

Grace to Operate Ammonia Plant in Puerto Rico

W. R. Grace and Co., New York, and Gonzalez Chemical Industries, Inc., Puerto Rico, have signed a contract under which Grace will manage and operate the Gonzalez ammonia and ammonium sulphate plant at Guanica, Puerto Rico. This contract is a first step in a contemplated reorganisation of Gonzalez Chemical Industries, Inc., in which it is expected that Grace will acquire a substantial amount of stock in the Puerto Rican company. Negotiations to this effect are continuing.

Under the contract, Grace will supply managerial, administrative and technical personnel, technical know-how and production services. The Gonzalez plant was designed and built by the Lummus Co., New York, in 1956, with a design capacity of 125 tons per day of ammonia and 350 tons per day of sulphuric acid which are combined to make over 400 tons per day of ammonium sulphate.

Joint S.A. Marketing by SASOL and National Chemicals

Two of the leading chemical producers in the Union of South Africa, National Chemical Products Ltd., Germiston, and the SASOL group are shortly to work together in the production and marketing of certain chemicals in the oxygenated organic range. To this end a joint subsidiary is being formed under the name of Kolchem (Pty.) Ltd.

Witco Chemical Open Branch in Holland

Witco Chemical, the European distributors of the carbon blacks manufactured by Continental Carbon of America, have announced that they have opened a branch in Rotterdam, Holland. Continental Carbon have started construction of a plant in the Rotterdam area, where about 15,000 tons a year of reinforcing furnace carbon blacks will be manufactured. The new Rotterdam office of Witco Chemical will serve as the sales office for the carbon blacks produced in Holland.

SunOlin Modify Montecatini Urea Process

To provide urea production on the east coast of the U.S. and urea of higher quality than hitherto available, Olin Mathieson and Sun Oil Co., have formed the jointly owned SunOlin Chemical Co. This company is building a 73,000 ton per year urea plant at North Claymont, Delaware. Start-up is scheduled for the spring of 1960.

Olin Mathieson and Sun Oil have made major engineering improvements on the basic Montecatini process which ensure a new level of quality of crystalline and prilled urea. Expected specifications indicated are: 99% purity min., for both crystal and prilled forms (% urea as determined by total N); pH (10% at 20°) 7.3 to 9.5 for crystal and 7.0 to 9.8 for the prilled urea; and moisture % 0.4 max. for crystal and 6.5 max. for prilled. Contributing to this new level of quality are processing steps and techniques which will virtually eliminate corrosion and result in a basically pure product.

B.A.S.F. Olefin Cracker Now on Stream

Badische Anilin- und Soda-Fabrik AG., Ludwigshafen, have brought into use a mineral crude oil cracking plant for the production of ethylene and other olefins.

Canadian Chemical Co. $4m. Expansion

Canadian Chemical Co. Ltd., announce an expansion programme which will increase production of their Edmonton, Alberta, plant by about 40%. Mr. R. Ord, president, said the expansion, to cost about $4 million and to be completed in early 1961, was necessitated by the

growth in sales over the past six years.

Basis of the expansion will be the use of oxygen in the petrochemical production process instead of air. This necessitates the construction of a plant to produce oxygen.

Major expansion for such a relatively small capital expenditure is made possible by the fact that the original design of the plant envisaged future expansion. Auxiliary facilities are already adequate and only the modification of some units is required.

Lurgi Uranium Extraction Plant in Rhineland

Mining for uranium ore has begun near Birkenfeld, in the Rhineland. Rock quarried from Buehlskopf Hill is being conveyed to a special process plant.

This plant, designed eventually to extract 50 to 60 grammes of raw uranium from 50 tons of rock, was erected by Lurgi Chemical and Smelting Corporation, of Frankurt.

Oslo Firm to Commercialise New Minerals Process

The Norwegian firm Elektrokemisk A/S, Oslo, have joined Koppers Co. Inc., Pittsburgh, Pa., and Strategic Materials Corp. of Niagara Falls, N.Y., in a scheme for commercialising the new Strategic-Udy process to smelt and refine iron ore and other minerals.

Acrylonitrile from Ammonia and Propylene

E.I. du Pont de Nemours and Co. Inc. have now joined Standard Oil of Ohio in choosing to produce acrylonitrile using as starting materials ammonia and propylene. Du Pont have their own recently patented process which they will use in a new plant they are building at Beaumont, Texas. The unit, which is scheduled to begin operating in 1961, will produce acrylonitrile for internal consumption in making Orlon.

Earlier this year du Pont started building their first acrylonitrile plant, using a hydrogen cyanide and acetylene process, at Memphis. Total output of acrylonitrile from the present U.S. producers is expected to reach 230 million lb. this year, up from 180 million lb. last year.

German Polythene Plant for Russia

Imhico, a member of the Imhausen group of chemical companies, have secured an order to supply to Russia a plant for the production of polythene. The order, announced at the Dusseldorf Plastics Fair, is valued at £12.7 million.

Joint Belgo-Jap Venture for Acetylene and Ethylene

Société Belge de l'Azote et des Produits Chimiques du Marly (S.B.A.), actylene producers, Liège, are with the Japanese concern Sumitomo Chemical Co. Ltd. to build a plant at Niihama City, Japan, for the production of acetylene and ethylene from liquid hydrocarbons.

Increases in Soviet Outputs

Output of mineral fertilisers in the U.S.S.R., according to the Central Statistical Board, in the first nine months of 1959 totalled 9½ million tons—103% of the corresponding period of 1958; output of sulphuric acid was 3,700,000 tons (106%), and output of artificial and synthetic fibre 131,000 tons (108%). Production of chemical equipment was valued at 1,200 million roubles (149%).

New Polystyrene Process

The U.S. petrochemical producers, Cosden Petroleum Corporation, have brought into operation a new plant for the annual production of 10,000 short tons of polystyrene at Big Spring, Texas. Cosden have replaced the usual benzole-and-ethylene process by what they call a 'natural process' from an ethyl benzole base. This process is said to involve the passing of a mineral oil fraction over a platinum contact and the separation of the ethyl benzole from xyloles in a 60-metre high column.

Caprolactam Produced in Armenia Photosynthetically

In the chemical combine of Kirovachan, in the Soviet Republic of Armenia, a plant has been brought into operation for the photosynthetic production of caprolactam. Instead of the usual several-stage chemical synthesis method, the material is to be obtained from the irradiation of cyclohexane and nitrosylchloride.

Un. Carbide's Italian and Belgian Plants in Production Soon

Two subsidiaries of Union Carbide International—S.P.A. Celene in Italy and Cobenam S.A. in Belgium—may shortly begin production of polythene, vice-president of the company, Mr. W. A. Woodcock, has announced.

Celene are due to start production in January with an annual capacity of 12,000 to 15,000 tons of polythene. The Belgian venture will be of similar capacity.

New Bisphenol-A Plant

Plans to build a new plant at Marietta, Ohio, for production of bisphenol-A are announced by Union Carbide Corporation. The company plan to offer this material for general sale in addition to its use for their own plastics manufacturing operations.

The plant, scheduled for commercial operation early in 1961, will have a rated annual capacity of 25 million lb. of bisphenol-A, and will be constructed at the existing plant site of the Union Carbide Plastics Co., division of Union Carbide.

£200,000 Superphosphate Plant Opened in Eire

A new £200,000 superphosphate plant has been opened in Wicklow, Eire by Shamrock Fertilisers Ltd., Woodstock Estate, Kilcoole, County Wicklow. Shamrock Fertilisers have started production in the new plant and have transferred their production of compound fertilisers to Foynes.

Mr. Herman Van den Bergh, managing director, said after the opening that the company was about to start building the necessary plant to manufacture sulphuric acid themselves. He added that imports of superphosphates last year totalled more than 50,000 tons; the production potential in Wicklow was 70,000 tons.

C.I.L. to Distribute Pro-fax Polypropylene in Canada

Polypropylene has now been added to the range of plastic resins sold by Canadian Industries Ltd. Arrangements have been made with Hercules Trading Corporation, U.S., for C.I.L. to distribute in Canada Pro-fax brand of polypropylene, manufacture by Hercules Powder Co. Pro-fax was the first polypropylene made in North America, and has been the only polypropylene available in commercial quantities for the past 18 months outside Europe.

C.I.L. will also distribute Hercules Penton brand of chlorinated polyether moulding powder.

More German PVC

The German member of the international Solvay group, Deutsche Solvay-Werke GmbH, of Rheinberg, are to raise their p.v.c. production from the present level of some 7,000 tonnes anually to an estimated 12,000 tonnes per year in the near future.

E.N.I. Get Gela Go-ahead

Erite Nazionale Idrocarburi (E.N.I.) has been given the go-ahead by Ministry of State Participations to build a large petrochemical plant at Gela, in Sicily. The plant is designed to process 3 million tons of crude oil annually.

Pechiney and St. Gobain Chemicals Merger

POOLING chemical activities in France are two of the largest French chemical companies, Pechiney and St. Gobain. An announcement from St. Gobain states that the two companies will form a new company in which they will each have an equal share for the marketing of their chemical products, including fertilisers and plastics.

The new company will also co-ordinate their research and manufacturing programmes in the chemical field. It will be responsible for the development of new factories and new activities of the two concerns and will eventually look after "all the interests and activities of the two founding companies in this field in France".

This fusion is probably the biggest which has ever occurred in France and one of the most important to be seen in France in any field in recent years.

Pechiney and St. Gobain, although with large interests outside the chemical industry (Pechiney is one of the two leading aluminium producers and St. Gobain a producer of glass on a world scale) rank second and fifth respectively among the ten leading French chemical companies; together they will be easily the largest, with a turnover likely soon to exceed Fr.100,000 million a year.

PEOPLE in the news

● **Dr. G. G. Haselden, Ph.D., B.Sc.Eng., D.I.C., A.M.I.Chem.E.,** senior lecturer in the chemical Engineering Department of the Imperial College of Science and Technology, has been appointed to the Brotherton Chair of Chemical Engineering in the Houldsworth School of Applied Science, Leeds University. Dr. Haselden will take up the professorship from 1 September next. **Dr. D. I. Davies, B.Sc., Ph.D.(Lond.),** has been appointed lecturer in the Department of Organic Chemistry at Leeds from 1 October. **Dr. A. R. Mathieson, M.Sc., Ph.D.,** is to join the Department of Textile Industries on 1 January as a lecturer in high polymer chemistry.

● **Mr. R. Levin, F.P.S., M.R.S.H.,** who has been appointed development planning executive at Aspro-Nicholas Ltd., 225 Bath Road, Slough, was formerly chief pharmacist of the Research and Development Division and latterly manager, technical information department, of the Distiller Co. (Biochemicals).

L. Schepers

R. Levin

● **Mr. L. Schepers,** a managing director of the Royal Dutch/Shell Group Co., has been appointed chairman of Shell Chemical Co. in succession to **Mr. F. A. C. Guepin,** who retired in June this year. Mr. Schepers studied at Delft Technical University and joined Shell in October 1926 when he took up an appointment with Astra Romana in Roumania. He later served in Indonesia, Argentina, Venezuela and Netherlands New Guinea. He was in the Far East at the time of the Japanese invasion and was interned from 1942-1945. After the war Mr. Schepers resumed his duties in Indonesia and then had assignments in the U.S. and Venezuela where he remained until taking up an important position in Bataafse Petroleum as head of the production department in January 1951. A year later he became a managing director of the Royal Dutch/Shell Group.

● **Mr. Michael Boby,** managing director of William Boby and Co. Ltd., Rickmansworth, Herts, arrives in Bermuda on 31 October to make a study of the island's water supplies. He will stay several days. Bermuda relies on stored rainwater, gathered from the limewashed roofs of the island's houses, for the bulk of her drinking supply, and during his visit Mr. Boby will explore the possibilities of developing other sources by electrodialysis.

● **Mr. Carl Bussow,** principal of A. W. Dow Inc., consulting chemists, New York, has been elected president of the Association of Consulting Chemists and Chemical Engineers, U.S. for 1959-60.

● **Mr. D. K. Fraser, M.I.Mech.E., M.I.Mar.E.,** at present managing director of Petters Ltd., Staines, will be joining the board of G. A. Harvey and Co. (London) Ltd., Greenwich Metal Works, London S.E.7, in the near future.

● **Mr. G. H. Black,** joint managing director of the Kestner Evaporator and Engineering Co. Ltd., London, left Great Britain at the end of October to visit the U.S. and Australia. A director of Kestner Australia Pty. Ltd., he will attach himself to the Sydney office and will be travelling widely in Australia.

● **Mr. Airey Neave,** M.P. for Abingdon, Berks, has been appointed to the main board of John Thompson Ltd., the Wolverhampton group of engineering companies and nuclear power station builders. His appointment takes effect from 21 October and he will direct the London affairs of the John Thompson group. Before he entered the Government in 1954, he was vice-chairman of the Conservative Party Atomic Energy Committee. From January 1959 until the last Parliament was prorogued, Mr. Neave was Under Secretary of State for Air.

● **Lord Baillieu,** president of Dunlop Rubber, was elected as the first president of the British Institute of Management at the annual meeting.

● **Professor P. V. Danckwerts, G.C., M.B.E., M.A.,** Shell Professor of Chemical Engineering at Cambridge University, has been elected to professional fellow of Pembroke College.

● **Dr. J. B. Chappell, B.A., Ph.D.,** university demonstrator in biochemistry, Cambridge, has been elected a fellow of Gonville and Caius College.

● **Mr. S. A. Hunwicks,** superintendent of projects in the armament department of the Royal Aircraft Establishment since 1954, has been appointed Director of Atomic Weapons (Development), Ministry of Supply, with effect from 2 November.

● **Mr. C. F. Dutton,** head of the by-products branch of the National Coal Board's marketing department, will retire at the end of January 1960. He is to be succeeded by **Mr. A. Bradley,** who before this appointment was sales manager of Chemical Engineering Wiltons.

● Two new staff appointments have been made by John and E. Sturge Ltd., Wheeleys Road, Birmingham 15, to cope with increasing sales. **Mr. G. J. Holiday** has been appointed to the newly-created position of sales supervisor for the greater London area and will deal with the pharmaceutical industry, and **Mr. L. R. Tomlinson** has joined the company from Allied Colloids Ltd. as a technical sales representative. He will be based at Birmingham and have special responsibilities for the rubber, plastics, paint, printing ink and paper industries.

Plastics Institute Meets in House of Commons

At the reception and conversazione held by the president of the Plastics Institute in the House of Commons on 9 October were, l. to r.: J. N. Ratcliffe, institute secretary, Mrs. Ratcliffe, Lieut.-Cdr. R. F. B. Bennett, M.P., Mrs. Wilson and H. F. Wilson, president

Commercial News

- **Briggs Raise Offer for Brit. Benzol Shares**
- **Fisons Propose One-for-three Scrip Issue**
- **Austrian Firm Reports 10% Output Rise**
- **U.S. Company Acquires Swiss Cilag-Chemie**

British Benzol

Henry Briggs Son and Co. (Trust) are raising their offer for the £1 ordinary units of British Benzol and Coal Distillation from 48s 6d to 52s 6d and are extending the acceptance date to 6 November. British Benzol directors recommend acceptance. (CHEMICAL AGE, 24 October, p. 584).

Edwards High Vacuum

Announcing a higher 6% (4%) interim dividend, the directors of Edwards High Vacuum Ltd. state that this increased interim is not to be taken as indicating in any way the year's total (the 1958 final was 12%).

Deliveries and orders received in respect of the first nine months are reported to be in excess of those for the same period of 1958.

Vitamins Ltd.

Ordinary stockholders in Vitamins Ltd. are being offered 455,200 5s ordinary shares at 20s each in the proportion of one for every five units held on 12 October.

Referring to the need for more capital, the directors point out that turnover has increased by about 30% over the last two financial years.

Profits for the year ending next March are expected to better last year's. It is hoped to maintain the dividend at 25% on the capital increased by the proposed 1-for-5 'rights' issue.

American Cyanamid Co.

Net income of American Cyanamid Co., U.S., for the nine months ended 30 September, is $40.03 million or $1.89 a share compared with $27.9 million or $1.32 a share a year ago. Net income for the third quarter is $12.8 million as against $8.68 million for the same quarter in 1958.

Parke Davis and Co.

Record sales and earnings are announced by Parke Davis and Co., U.S., for the first nine months of 1959. Earnings totalled $22.21 million or $1.50 ($1.26 as adjusted) per shares. Sales at $141.64 million compared with £125.21 million for the previous year.

Fisons Ltd.

Fisons Ltd. are raising their dividend from the equivalent of 10% to 12% on a capital increased by a one-for-two scrip issue with a final of 8%, as forecast for the year ended 30 June 1959. It is also proposed to capitalise £3,869,908 in a one-for-three scrip issue to those registered on 27 November.

Group trading profit and investment expanded from £3,142,478 to £3,641,360 after charging £1,274,440 (£1,184,609) for depreciation and £431,822 (£437,497) for interest charges. After tax and minority interests, there is a net profit of £1,800,527 compared with £1,594,970.

During the year fixed assets of the company and its U.K. subsidiaries were revalued and a surplus of £6,981,367 added to capital reserves.

A.K.U.

Algemene Kunstzijde Unie, of Holland, state that in the first three quarters of 1959 their net profit has amounted to Fl.22,000,000 (some £2¼ million), or 30% more than in the first nine months of last year. The third quarter has broken all records for the company with profits of Fl.12,700,000 (about £1,300,000), compared with Fl.9,600,000 (some £970,000). The excellent profits are attributed partly to the 55% A.K.U. subsidiary in the U.S., the Enka synthetic fibre concern.

B.P. Benzin und Petroleum

At the annual meeting of the West German oil refining and petrochemical company B.P. Benzin und Petroleum AG., a subsidiary of British Petroleum, permission was given to increase the DM.300 million (about £25 million) capital by a further DM.50 million (some £4,167,000) by 31 December 1960.

Nobel-Bozel Merger

Should general meetings of the shareholders of the two French chemical companies Nobel-Bozel and Société Générale d'Explosifs 'Chedites' to be held early next month agree to a proposed merger, the two companies will fuse in the near future.

Österreichische Stickstoffwerke

Total company production of Österreichische Stickstoffwerke AG, Austria, last year was some 10% higher than that for 1957, it is stated in the report for 1958. The combined output—of 990,000 tonnes—was well above the average capacity working of the plant, and in all branches other than sulphuric acid and superphosphate production the plant was operating at 100%. Nitrogen production rose by 3% over the year under report, and the production of urea, which the company had only just taken up, was higher than had been anticipated.

The Stickstoffwerke turnover for the 1958 financial year was at Sch.1,118 million (some £14 million) higher by 3% than that for the previous year, despite falls in export prices and considerably smaller stocks of nitrogenous fertilisers than in 1957; the superphosphate and urea trade of the firm made up for these disadvantages. Although total turnover from home sales rose steadily to make up by the end of the financial year 60% of all turnover, as against only 47% a year before. Sales of nitrogenous fertilisers totalled 773,000 tonnes, and some 77% went to foreign customers.

With a net profit for the year of Sch.19,700,000 (about £246,000), dividend is 4½%.

A total of Sch.39,100,000 (nearly £500,000) is at present invested in holdings. The Danubia-Petrochemie AG, owned jointly wtih Montecatini and which will start production of polypropylene at the end of next year, is to receive a loan of Sch.100,000,000 (£1,250,000) from Stickstoffwerke and Montecatini within the next few months.

Pfizer International

An agreement has been signed for the establishment of an Egyptian subsidiary of Pfizer International with a £E200,000 capital, 60% of which will be contributed by the parent company. The factory, which is due to start production within 12 months, will manufacture sufficient of the U.S. company's pharmaceutical, veterinary and agricultural products to make available ultimately a surplus for export.

Cilag-Chemie

The Swiss chemical concern Cilag-Chemie, of Schaffhausen, formerly owned mainly by the Basle holding company of Internationale Industrie- und Handelstebeiligungs- AG, has been taken over by the New Brunswick, U.S., firm of Johnson and Johnson. The U.S. company will make Cilag the foundation for a steady European trade, although leaving the company in its present form and under Swiss leadership.

Increases of Capital

ALLIED COLLOIDS (MANUFACTURING) CO. LTD., Cleckheaton Road, Low Moor, Bradford. Increased by £100,000 beyond the registered capital of £105,000.

ALLIED COLLOIDS (BRADFORD) LTD., manufacturers of chemicals, etc., 18a North Parade, Bradford. Increased by £100,000 beyond the registered capital of £106,000.

3,000 Gall. Tank for Deionised Water

A 3,000 gall. cylindrical storage tank for deionised water has been manufactured by Cawley Plastics Ltd., Weylock Works, Byfleet Road, New Haw, Weybridge, Surrey, for the Mullard Radio Valve Co. Ltd. The tank, in Tufplas—a chemically bonded lamination of unplasticised p.v.c. and chemical grade polyester resin reinforced with glass-fibre—is 13 ft. by 7 ft. in diameter. It is believed to be the largest tank of this material being used for deionised water storage.

BRITISH CHEMICAL PRICES

GENERAL CHEMICALS

Acetic Acid. D/d in ret. barrels (tech. acid barrels free); in glass carboys, £8; demijohns, £12 extra. 80% tech., 10 tons, £97; 80% pure, 10 tons, £103; commercial glacial, 10 tons, £106.

Acetic Anhydride. Ton lots d/d, £128.

Alum. Ground, f.o.r., about £25.
MANCHESTER: Ground, £25.

Aluminium Sulphate. Ex-works, d/d, £15 10s to £18.
MANCHESTER: £16 to £18.

Ammonia, Anhydrous. Per lb., 1s 9d-2s 3d.

Ammonium Chloride. Per ton lot, in non-ret. pack, £33 2s 6d.

Ammonium Nitrate. D/d, 4-ton lots, £31.

Ammonium Persulphate. Per cwt., in 1-cwt. lots, d/d, £6 13s 6d; per ton, in min. 1-ton lots, d/d, £123 10s.

Ammonium Phosphate. Mono-and di-, ton lots, d/d, £106 and £97 10s.

Antimony Sulphide. Per lb., d/d UK in min. 1-ton lots; crimson, 5s d/d to 5s 5½d; golden, 3s 3½d d/d per lb. to 4s 8½d d/d.

Arsenic. Ex-store, £45 to £50.

Barium Carbonate. Precip., d/d, 5-ton lots or more, bag packing, £41.

Barium Chloride. 2-ton lots, £46.

Barium Sulphate [**Dry Blanc Fixe**]. Precip. 2-ton lots, d/d, £39.

Bleaching Powder. Ret. casks, c.p. station, in 4-ton lots. £30 7s 6d.

Borax. Ton lots, in hessian sacks, c.p. Tech. anhydrous, £70; gran., £47; crystal, £50 10s; powder, £51 10s; extra fine powder, £52 10s; BP, gran., £56; crystal, £59 10s; powder, £60 10s; extra fine powder, £61 10s. Most grades in 6-ply paper bags, £1 less.

Boric Acid. Ton lots, in hessian sacks, c.p. Comm., gran., £78; crystal, £87; powder, £84 10s; extra fine powder, £86 10s; BP gran., £91; crystal, £99; powder, £96 10s; extra fine powder, £98 10s. Most grades in 6-ply paper bags, £1 less.

Calcium Chloride. Ton lots, in non-ret. pack; solid and flake, about £15.

Chlorine, Liquid. In ret. 16-17 cwt. drums d/d in 3-drum lots, £41.

Chromic Acid. Less 2½%, d/d UK, in 1-ton lots, per lb., 2s 2¾d.

Chromium Sulphate, Basic. Crystals, d/d, per lb., 8½d; per ton, £79 6s 8d.

Citric Acid. In kegs, 1-4 cwt. lots, per cwt., £9 18s 6d; 5 cwt. lots, up per cwt., £9 15s; packed in paper bags, 5 cwt. lots, up, per cwt., £9 8s 6d.; 1-4 cwt. lots, per cwt., £9 13s 6d.

Cobalt Oxide. Black, per lb., d/d, bulk quantities, 13s 2d.

Copper Carbonate. Per lb., 2s 1d.

Copper Sulphate. £81 per ton less 2% f.o.b. Liverpool.

Cream of Tartar. 100%, per cwt., about £11 12s.

Formaldehyde. In casks, d/d, £40.

Formic Acid. 85%, in 4-ton lots, c.p., £91.

Glycerine. Chem. pure, double distilled 1.2627 s.g., per cwt., in 5-cwt. drums for annual purchases of over 5-ton lots and under 25 tons, £12 1s 6d. Refined technical grade industrial, 5s per cwt less than chem. pure.

Hydrochloric Acid. Spot, per carboy, d/d (according to purity, strength and locality), about 12s.

Hydrofluoric Acid. 60%, per lb., about 1s 2d.

Hydrogen Peroxide. Carboys extra and ret. 27.5% wt., £119 0s 0d; 35% wt., d/d, £143.

Iodine. Resublimed BP, under 1 cwt., per lb., 11s; for 1-cwt. lots, per lb., 10s 6d.

These prices are checked with the manufacturers, but in many cases there are variations according to quality, quantity, place of delivery, etc. Abbreviations: d/d, delivered; c.p., carriage paid; ret., returnable; non-ret. pack., non-returnable packaging; tech., technical; comm., commercial; gran., granular.

All prices per ton unless otherwise stated

Iodoform. Under 1 cwt., per lb., £1 2s 4d, for 1-cwt. lots, per lb., £1 1s 8d, 5 cwt., per lb., 21s 1d, crystals, 3s more.

Lactic Acid. Pale tech., 44% by wt., per lb., 14d; dark tech., 44% by wt., per lb., 9d; chem. quality, 44% by wt., per lb., 12½d; 1-ton lots, ex-works, usual container terms.

Lead Acetate. White, about £154.

Lead Nitrate. 1-ton lots, about £135.

Lead, Red. Basic prices: Genuine dry red, £104 15s; orange lead, £116 15s; Ground in oil: red, £125 5s, prange, £137 5s.

Lead, White. Basis prices: Dry English in 5-cwt. casks, £116 15s; Ground in oil: English, 1-cwt. lots, per ton, £135 15s.

Lime Acetate. Brown, ton lots, d/d, £40; grey, 80-82%, ton lots, d/d, £45.

Litharge. In 5-cwt. lots, £106 15s.

Magnesite. Calcined, in bags, ex-works, about £21.

Magnesium Carbonate. Light, comm., d/d, 2-ton lots, £84 10s under 2 tons, £97.

Magnesium Chloride. Solid (ex-wharf), £17 10s.

Magnesium Oxide. Light, comm., d/d, under 1-ton lots, £245.

Magnesium Sulphate. Crystals, £16.

Mercuric Chloride. Tech. powder, per lb., for 1-ton lots, £1 1s; 5-cwt. lots, in 28-lb. parcels, £1 1s 3d; 1-cwt. lots, £1 1s 6d.

Mercury Sulphide, Red. 5-cwt. lots in 28-lb. parcels, per lb., £1 10s 6d; 1-cwt. lots, £1 11s.

Nickel Sulphate. D/d, buyers UK, nominal, £170.

Nitric Acid. 80° Tw., £35 2s.

Oxalic Acid. Home manufacture, min. 4-ton lots, in 5-cwt. casks, c.p., about £133.

Phosphoric Acid. Tech. (s.g. 1.700) ton lots, c.p., £100; BP (s.g. 1.750), ton lots, c.p., per lb., 1s 4d.

Potash, Caustic. Solid, 1-ton lots, £95 10s; liquid, £36 15s.

Potassium Carbonate. Calcined, 96/98%, 1-ton lots, ex-store, about £76.

Potassium Chloride. Industrial, 96%, 1-ton lots, about £24.

Potassium Dichromate. Gran., per lb., in 5-cwt. to 1-ton lots, d/d UK, 1s 2¼d.

Potassium Iodide. BP, under 1-cwt., per lb., 7s; per lb. for 1-cwt. lots, 6s 10d.

Potassium Nitrate. 4-ton lots, in non-ret. pack, c.p., £63 10s.

Potassium Permanganate. BP, 1-cwt. lots, per lb., 1s 11½d; 3-cwt. lots, per lb., 1s 11¼d; 5-cwt. lots, per lb., 1s 10¾d; 1-ton lots, per lb., 1s 10½d; 5-ton lots, per lb., 1s 10d. Tech., 1-ton lots in 1-cwt. drums, per cwt., £9 18s; 5-cwt. in 1-cwt. drums, per cwt., £10; 1-cwt. lots, £10 9s.

Salammoniac. Ton lot, in non-ret. pack, £47 10s.

Salicylic Acid. MANCHESTER: Tech., d/d, per lb., 2s 6d, cwt. lots.

Soda Ash. 58% ex-depot or d/d, London station, 1-ton lots, about £16 11s 6d.

Soda, Caustic. Solid 76/77%; spot, d/d 1-ton lots, £33 16s 6d.

Sodium Acetate. Comm. crystals, d/d, £75 8s.

Sodium Bicarbonate. Ton lot, in non-ret. pack, £12 10s.

Sodium Bisulphite. Powder, 60/62%, d/d 2-ton lots for home trade, £46 2s 6d.

Sodium Carbonate Monohydrate. Ton lot, in non-ret. pack, c.p., £64.

Sodium Chlorate. 1-cwt. drums, c.p. station, in 4-ton lots, about £88 10s.

Sodium Cyanide. 96/98%, ton lot in 1-cwt. drums, £126.

Sodium Dichromate. Gran. Crystals per lb., 1s. Net d/d UK, anhydrous, per lb., 1s 1¼d. Net del. d/d UK, 5-cwt. to 1-ton lots.

Sodium Fluoride. D/d, 1-ton lots and over, per cwt., £5; 1-cwt. lots, per cwt., £5 10s.

Sodium Hyposulphite. Pea crystals, £38; comm., 1-ton lots, c.p., £34 15s.

Sodium Iodide. BP, under 56 lb. per lb., 10s; 56 lb. and over, 9s 9d.

Sodium Metaphosphate [**Calgon**]. Flaked, paper sacks, £133.

Sodium Metasilicate. (Spot prices) D/d UK in 1-ton lots, 1-cwt. free paper bags, £29.

Sodium Nitrate. Chilean refined gran. over 98%, 6-ton lots, d/d c.p., per ton, £29.

Sodium Nitrite. 4-ton lots, £32.

Sodium Perborate. (10% available oxygen) in 1-cwt. free kegs, 1-ton lots, £129 10s; in 1-cwt. lots, £139 5s.

Sodium Percarbonate. 12½% available oxygen, in 1-cwt. kegs, £170 15s.

Sodium Phosphate. D/d, ton lots: di-sodium, crystalline, £40 10s, anhydrous, £88; tri-sodium, crystalline, £39 10s, anhydrous, £86.

Sodium Silicate. (Spot prices) 75-84° Tw. Lancs and Ches., 6-ton lots, d/d station in loaned drums, £12 10s; Dorset, Somerset and Devon, per ton extra, £3 5s; Scotland and S. Wales, extra, £2 17s 6d. Elsewhere in England, not Cornwall, extra, £1.

Sodium Sulphate [**Desiccated Glauber's Salt**]. D/d in bags, about £19.

Sodium Sulphate [**Glauber's Salt**]. D/d, up to £14.

Sodium Sulphate [**Salt Cake**]. Unground, d/d station in bulk, £10.
MANCHESTER: d/d station, £10 10s.

Sodium Sulphide. Solid, 60/62%, spot, d/d, in drums in 1-ton lots, £36 2s 6d; broken, d/d, in drums in 1-ton lots, £37 2s 6d.

Sodium Sulphite. Anhydrous, £71 10s; comm., d/d station in bags, £27-£28 10s.

Sulphur. 4 tons or more, ground, according to fineness, £20-£22.

Sulphuric Acid. Net, naked at works, 168° Tw. according to quality, £10-£11 12s 6d; 140° Tw., arsenic free, £8 7s 6d; 140° Tw., arsenious, £8 2s 6d.

Tartaric Acid. Per cwt.: 10 cwt. or more, in kegs, 300s; in bags, 292s per cwt.

Titanium Oxide. Standard grade comm., rutile structure, £178; standard grade comm., anatase structure, £163.

Zinc Oxide. Per ton: white seal, £112 10s; green seal, £110 10s; red seal, £107 10s.

SOLVENTS AND PLASTICISERS

Acetone. All d/d. In 5-gal. drums, £128; in 10-gal. drums, £118; in 40-45 gal. drums, under 1 ton, £93; 1-5 tons, £90; 5-10 tons, £89; 10 tons and up, £88; in 400-gal. tank wagons, £85.

Butyl Acetate BSS. 10-ton lots, £173.

***n*-Butyl Alcohol BSS.** 10 tons, in drums, d/d, £149.

***sec*-Butyl Alcohol.** All d/d. In 5-gal. drums, £168; in 10-gal. drums, £158; in 40-45 gal. drums, under 1 ton, £133; 1-5 tons,

£130; 5-10 tons, £129; 10 tons and up, £128; in 400-gal. tank wagons, £125.

***tert*-Butyl Alcohol.** 5-gal. drums, £195 10s; 40/45-gal. drums: 1 ton, £175 10s; 1-5 tons, £174 10s; 5-10 tons, £173 10s; 10 tons and up, £172 10s.

Diacetone Alcohol. Small lots: 5-gal. drums, £185; 10-gal. drums, £175. 40/45-gal. drums: under 1 ton, £148; 1-5 tons, £147; 5-10 tons, £146; 10 tons and over, £145, in 400-gal. tank wagons, £142.

Dibutyl Phthalate. In drums, 10 tons, d/d per ton, £210; 45-gal. drums, d/d, 1-4 drums, £216.

Diethyl Phthalate. In drums, 10 tons, per ton, £187 10s; 45-gal. drums, d/d, 1-4 drums, £193 10s.

Dimethyl Phthalate. In drums, 10 tons, per ton, d/d, £179; 45-gal. drums, d/d, 1-4 drums, £185.

Dioctyl Phthalate. In drums, 10 tons, d/d, per ton, £284; 45-gal. drums, d/d, 1-4 drums, £290.

Ether BSS. 1-ton lots, drums extra, per lb., 1s 11d.

Ethyl Acetate. 10-ton lots, d/d, £145.

Ethyl Alcohol [PB 66 o.p.]. Over 300,000 p. gal., 4s 0½d; d/d in tankers, 2,500-10,000 p. gal. per p. gal., 4s. 2¾d. D/d in 40/45-gal. drums, p.p.g. extra, 1d. Absolute alcohol (75.2 o.p.), p.p.g. extra, 5d.

Methanol. Pure synthetic, d/d, £43 15s.

Methylated Spirit. Industrial 66° o.p.: 500-gal. and up, d/d in tankers, per gal., 5s 10½d; 100-499 gal. in drums, d/d per gal., 6s 3d-6s 5d. Pyridinised 66° o.p.: 500 gal. and up, in tankers, d/d, per gal., 6s 2d; 100-499 gal. in drums, d/d, per gal., 6s 6½d-6s 8½d.

Methyl Ethyl Ketone. All d/d. In 5-gal. drums, £183; in 10-gal. drums, £173; in 40/45-gal. drums, under 1 ton, £148; 1-5 tons, £145; 5-10 tons, £144; 10 tons and up, £143; in 400-gal. tank wagons, £140.

Methyl *iso*Butyl Carbinol. All d/d. In 5-gal. drums, £203; in 10-gal. drums, £193; 40-45 gal. drums, less than 1 ton, £168; 1-9 tons, £165; 10 tons and over, £163; in 400-gal. tank wagons, £160.

Methyl *iso*Butyl Ketone. All d/d. In 5-gal. drums, £209; in 10-gal. drums, £199; in 40/45-gal. drums, under 1 ton, £174; 1-5 tons, £171; 5-10 tons, £170; 10 tons and up, £169; in 400-gal. tank wagons, £166.

***iso*Propyl Acetate.** In drums, 10 tons, d/d, £137; 45-gal. drums, d/d, £143.

***iso*Propyl Alcohol.** Small lots: 5-gal. drums, £118; 10-gal. drums, £108; 40/45-gal. drums: less than 1 ton, £83; 1-9 tons, £81; 10-50 tons, £80 10s; 50 tons and up, £80.

RUBBER CHEMICALS

Carbon Disulphide. According to quality, £61-£67.

Carbon Black. GPF: Ex-store, Swansea. Min. 3-ton lots, one delivery, 7¼d per lb.; min. 1-ton lots and up to 3-tons, one delivery, 7¾d per lb.; ex-store, Manchester, London and Glasgow, 8¼d per lb. HAF: ex-store, Swansea; Min. 3-ton lots, one delivery, 8d per lb.; min. 1-ton lots and up to 3-tons, one delivery, 8¼d per lb. Ex-store Manchester, London and Glasgow, 9d per lb.

Carbon Tetrachloride. Ton lots, £83 15s.

India-Rubber Substitutes. White, per lb., 1s 4½d to 1s 7d; dark, d/d, per lb., 1s 0½d to 1s 4d.

Lithopone. 30%, about £55 10s for 5-ton lots.

Mineral Black. £7 10s-£10.

Sulphur Chloride. British, about £50.

Vegetable Lamp Black. 2-ton lots, £64 8s.

Vermilion. Pale or deep, 7-lb. lots, per lb., 15s 6d.

COAL TAR PRODUCTS

Benzole. Per gal., min. 200 gal., d/d in bulk, 90's, 5s 3d; pure, 5s 7d.

Carbolic Acid. Crystals, min. price, d/d bulk, per lb., 1s 4d; 40/50-gal. ret. drums extra, per lb., ¼d. Crude, 60's, per gal., 8s 4d.
MANCHESTER: Crystals, d/d, per lb., 1s 4d-1s 7d; crude, naked, at works, 8s 5d.

Creosote. Home trade, per gal., according to quality, f.o.r. maker's works, 1s-1s 9d.
MANCHESTER: Per gal., 1s 2d-1s 8d.

Cresylic Acid. Pale 99/100%, per gal., 6s 8d. D/d UK in bulk: Pale ADF, per imperial gallon f.o.b. UK, 8s; per US gallon, c.i.f. NY, 103.50 cents freight equalised.

Naphtha. Solvent, 90/160°, per gal., 4s 10d; heavy, 90/190°, for bulk 1,000-gal. lots, d/d, per gal., 3s 11d. Drums extra; higher prices for smaller lots.

Naphthalene. Crude, 4-ton lots, in buyers' bags, nominal, according to m.p.: £19-£30; hot pressed, bulk, ex-works, £40; refined crystals, d/d min. 4-ton lots, £65-£68.

Pitch. Medium, soft, home trade, f.o.r. suppliers' works, £10 10s; export trade, f.o.b. suppliers' port, about £12.

Pyridine. 90/160, per gal., 15s.

Toluol. Pure, per gal., 5s 2d; 90's, d/d, 2,000 gal. in bulk, per gal., 4s 11d.
MANCHESTER: Pure, naked, per gal., 5s 6d.

Xyole. According to grade, in 1,000-gal. lots, d/d London area in bulk, per gal., 5s 9d-6s.

INTERMEDIATES AND DYES
(Prices Normal)

***m*-Cresol** 98/100%. 10 cwt. lots d/d, per lb., 4s 9d.

***o*-Cresol** 30/31°C. D/d, per lb., 1s.

***p*-Cresol** 34/35°C. 10 cwt. lots d/d, per lb., 5s.

Dichloraniline. Per lb., 4s 6d.

Dinitrobenzene. 88/99°C., per lb., 2s 1d.

Dinitrotoluene. Drums extra. SP 15°C., per lb., 2s 1½d; SP 26°C., per lb., 1s 5d; SP 33°C., per lb., 1s 2½d; SP 66/68°C., per lb., 2s 1d.

***p*-Nitraniline.** Per lb., 5s 1d.

Nitrobenzene. Spot, 90 gal. drums (drums extra), 1-ton lots, d/d, per lb., 10d.

Nitroanphthalene. Per lb., 2s 5½d.

***o*-Toluidine.** 8-10 cwt. drums (drums extra), per lb., 1s 11d.

***p*-Toluidine.** In casks, per lb., 6s 1d.

Dimethylaniline. Drums extra, c.p., per lb., 3s 4d.

Price Index for Chemicals Shows Slight Rise

AT 105.3 for September, the Board of Trade wholesale price index for chemicals and allied industries, showed a slight increase over August and an increase of 1.6 points over September 1958. The following extract from the table is based on a 1954 average of 100:

	Sept. 1959	Aug. 1959	Sept 1958
Chemicals and Allied Industries:			
Total sales	105.3*	104.9*	103.7
Home market sales ...	106.4*	106.0*	105.0
General chemicals ...	106.4*	106.6	107.3
Pharmaceutical chemicals	82.1	82.2	82.2
Synthetic resins and plastics materials ...	90.0*	90.1	92.6
Pyrites, c.i.f. U.K. ports	64.2	65.2	75.1
Sulphur, crude (for acid making), c.i.f. ...	77.4	77.6	80.0

* Provisional figure.

McCarthy Hold Laboratory Exhibition in Cardiff

A two-day exhibition of laboratory furnishings, scientific apparatus, chemicals and glassware, held in the Queen's Hotel, Cardiff, on 13 and 14 October by T. W. McCarthy and Sons Ltd., laboratory furnishers, 30a Clifton Street, Cardiff, was well attended. The firm hope that it will be the first of many similar exhibitions in the area. Companies represented were Quickfit and Quartz, Hudes Merchandising, H. J. Elliott, May and Baker, R. and L. Enterprises, and Electrothermal Equipment.

Course on Developments in Analytical Chemistry

A two-day course on 'Recent developments in analytical chemistry', is to be held at Coventry Technical College on 3 and 4 December, in collaboration with Professor R. Belcher. Fee for the course is £1 1s. Lectures will be given by Dr. H. N. Irving (ion exchange resins), D. Betteridge (solvent extraction separations), Dr. T. S. West (use of EDTA and end point determination), and Professor Belcher (elemental organic analysis).

Market Reports

DEMAND MAINTAINED

LONDON Demand for industrial chemicals, both for home and export, has been maintained and contract delivery specifications have covered good quantities. A steady business has been reported for the potash chemicals while the routine soda products are moving well with bichromate and chlorate of soda fairly active.

Sulphate of copper continues to attract attention at the higher quotation which sharply advanced to £81 per ton less 2% f.o.b. Liverpool. The advance in zinc prices has led to a further increase in price of zinc oxide. From 26 October, white seal is quoted at £112 10s., green seal £110 10s., and red seal £107 10s. per ton.

There is little of fresh interest in the general position of agricultural chemicals, and fertiliser demand remains at a seasonal level. Inquiry for the coal tar products has been steady with pitch in good request.

MANCHESTER A generally satisfactory movement of heavy chemicals to leading industrial consumers has been reported on the Manchester market. Replacement business is coming forward in fair volume. Shipping business continues satisfactory for most lines. Quotations are steady-to-firm and there is little sign of easiness; a feature has been a sharp advance in sulphate of copper to £81 a ton.

SCOTLAND The volume of business has been well maintained in the Scottish heavy chemical market, and overall a good week's trading can be reported. The basic chemicals were well demanded and once again quantities showed little change. Interest was also shown in regard to enquiries and forward deliveries. With the exception of prices related to metal derivatives, the position continued steady.

TRADE NOTES

Czech Polarographs

Three Czech polarographic instruments, designed at Professor Heyrovsky's Polarographic Research Institute, Prague, are being sold and serviced in the U.K. by the sole agents, Nash and Thompson Ltd., Hook Rise, Tolworth, Surrey. They are the Kovo P.567 polaroscope, an oscilloscope adapted to polarographic analysis; Kovo LP.54 manual d.c. polarograph, which is semi-automatic; and the LP.55A polarograph, a photographic recording instrument of a type not made in the U.K.

Stainless Steel Filters

M.P.C. porous stainless steel filters for liquids, gases or vapours are described in a new leaflet available from Metal and Plastic Components Ltd., Montgomery Street, Birmingham 11. The leaflet covers composition, corrosion resistance, grades, permeability coefficient, flow characteristics, cleaning, applications and other details.

Flow Measurement

Gapmeters, a series of compact, direct reading, variable-area flow-meters for liquids and gases, are described in a new leaflet published by G. A. Platon Ltd., 323 Whitehorse Road, Croydon, Surrey.

Agents for Polybutenes

Kingsley and Keith, Ltd., Rex House, King William Street, London E.C.4, have been appointed exclusive distributors for the U.K., N. Ireland and Eire for Amoco Indopol polybutenes. They will work closely with Dr. A. J. Skey, European representative for Amoco Chemicals, who is located in London. Kingsley and Keith will handle all 10 grades of Indopol polybutenes, which have molecular weights from 300 to 1,900 and viscosities at 210°F of 40.6 to 20,500 SSU.

Pipe Lagging

A revised version of 'Stilclad Preformed Pipe Insulation Sections, Technical Data No. 15/59' gives details of a fireproof mineral wool pipe insulating section designed to meet the requirements of B.S. 1588 (thermal insulating materials suitable for use within the temperature range 200°F to 450°F) and B.S. 1344 (pre-formed thermal insulating materials for central heating and hot and cold water supply installations). A graph gives the thermal conductivity of the insulating sections over its temperature range of up to 500°F; and tables provide the thickness of insulation required to comply with B.S. specifications. Copies are available from Stillite Products Ltd., 15 Whitehall, London S.W.1.

Dickow Pumps to be Made in U.K.

Firth-Firth Cleveland Pumps Ltd., Stornoway House, Cleveland Row, London S.W.1, are to manufacture under licence the range of self-priming multi-stage centrifugal pumps designed and developed by Dickow-Pumpen, Wailkrayburg, near Munich. The U.K. company will sell the pumps in all parts of the world, except for the Common Market countries, Scandinavia and India. Dickow pumps can handle a wide variety of liquids and sludges at temperatures up to 250°F.

Abril BPK 'L'

'Wax technical service bulletin 63' issued by Bush Beach and Segner Bayley Ltd., Marlow House, Lloyd's Avenue, London E.C.3, describes Abril BPK 'L', which is said to give a completely clear solution in water when used in liquid detergent formulations. About 10-15% by weight of the active matter present is sufficient to promote lathering and to exert a synergistic action of benefit to detergent powder. The pH of a dilute aqueous solution of the product lies between 8 and 9 and it retains its effectiveness up to a pH of 11. Also described is BBG wax 89, a new wax produced for the manufacture of both dry-bright and paste polishes.

Silicon Iron Expansion

Increased demand for Tantiron, corrosion-resistant high silicon iron for acid plant, has led the Lennox Foundry Co. Ltd. New Cross, to install an additional melting furnace with a capacity of 200 tons per annum.

In addition, arrangements have been reached for manufacture in South Africa, where Tantiron plant and equipment will be handled by Kestners South Africa Pty. Ltd. Johannesburg. Tantiron has been manufactured by Lennox Foundry (one of the Kestner group) since 1910.

Resex (P) Ion Exchange

A newly published 50-page booklet entitled 'Resex (P) in Base Exchange Water Softening' is available from Joseph Crosfield and Sons Ltd., Warrington. This high-capacity polystyrene bead cation exchange material is supplied in the sodium form, ready for immediate use in a softening unit after placing in position and backwashing. Advantages claimed are that it is usable over a wide pH range; it is unaffected by oxidising or reducing agents or by use in hot solutions up to 110°C or by high free CO_2 or low silica content waters; it is uniform in particle shape: usable at high flow rates with minimum pressure loss; and not affected in base exchange practice by waters of high magnesium to calcium ratio.

Polyflex Polystyrene Sheet

Grades of Polyflex polystyrene sheet are now available for vacuum-forming and pressure-forming. Modifications in forming techniques and equipment have overcome former problems of orientation tension during thermo-forming operations. The general physical and chemical properties of the new grades are identical with those of the standard material previously available. The new products, known as Polyflex 100 pressure forming grade are supplied by Monsanto Chemicals Ltd., 10-18 Victoria Street, London S.W.1, in gauges from 0.003 in. to 0.020 in. and in standard roll width of 21 in. and 42 in.

NEW PATENTS

By permission of the Controller, HM Stationery Office, the following extracts are reproduced from the 'Official Journal (Patents)', which is available from the Patent Office (Sales Branch), 25 Southampton Buildings, Chancery Lane, London W.C.2, price 3s 6d including postage; annual subscription £8 2s.

Specifications filed in connection with the acceptances in the following list will be open to public inspection on the dates shown. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any time within the prescribed period.

ACCEPTANCES

Open to public inspection 16 December

Method of purging the atmosphere of enclosed or confined spaces and for combating fires in such places. Minister of Power. **825 444**

Electrodialysing apparatus. National Research Development Corp. **825 362**

Process and apparatus for electrolytic decomposition of the amalgams, Kandler, L., and Vogt, H. **825 445**

Process of making polymeric acids. Emery Industries Inc. **825 534**

Dimerising mono-unsaturated fatty acids. Emery Industries Inc. **825 535**

Dithiocarbamic acid ester derivatives containing sulphonic groups and their production. Dehydag Deutsche Hydrierwerke GmbH. **825 536**

Linear copolyester films. Du Pont de Nemours & Co., E. I. **825 549**

Water-repellent finishes. Bradford Dyers Association Ltd. [Divided out of 814 899.] **825 551**

Dehydrogenation of alcohols. Knapsack-Griesheim AG. **825 602**

Oxygen-balanced, plastic, safety explosive and a process for its production. Nitroglycerin AB. **825 367**

Method of purifying sewage water. Elektrokemisk AS. **825 629**

Deterioration retarders for rubber and rubber compositions containing same. Goodrich Co., B. F. **825 630**

Polyesters. Goodrich Co., B. F. **825 287**

Bis-phenol-ketone condensation products and rubber compositions containing same. Goodrich Co., B. F. **825 603**

Extracting and separating niobium and tantalum. Ciba Ltd. **825 604**

Corrosion resistant coatings. St. Helens Cable & Rubber Co. Ltd. **825 457**

Electrolytic coating of magnesium and magnesium alloys by anodic treatment. General Electric Co. Ltd. **825 458**

Electrolytic decomposition-cell. Elektrochemisches Kombinat Bitterfeld Veb. **825 374**

Purification of terephthalic acid. Farbwerke Hoechst AG. **825 375**

Quinone compounds and process for their manufacture. Ciba Ltd. **825 557**

Water-insoluble monoazo triazine dyestuffs and processes for their manufacture. Imperial Chemical Industries Ltd. [Cognate application 1 311.] **825 377**

Bonded molecular sieves. Union Carbide Corp. **825 379**

Phenothiazine derivatives and process for their preparation. Upjohn Co. **825 561**

Substituted spiro-pyrazolidines. Upjohn Co. **825 562**

α- α-Diaryl-2-substituted pyrrolidyl alkyl compounds. Upjohn Co. **825 563**

Sulphonation of aromatic polymers. Permutit Co. Ltd. **825 422**

Cobalt complexes of 3-amino-4-hydroxy-benzene sulphonylmorpholine monoazo dyestuffs. Fairweather, H. G. C. (General Aniline & Film Corp.). **825 606**

Desizing of glass fibres. Kilby, W., and White, W. A. S. **825 507**

Null-type radiation analysis system. Perkin-Elmer Corp. **825 509**

Treatment of regenerated cellulose textile fabrics. Courtaulds Ltd. **825 608**

Oxidation of organic compounds. Imperial Chemical Industries Ltd. [Cognate application 12 006.] **825 429**

Triazole derivatives. Farbenfabriken Bayer AG. **825 514**

Copper containing disazo dyestuffs of the stilbene series. Geigy AG., J. R. **825 431**

Hardening gelatin. Kodak Ltd. **825 544**

Production of halobutadienes. Distillers Co. Ltd. **825 609**

Filters for gases and liquids. Coopers Mechanical Joints Ltd., Witchell, S. P., and Finch, G. **825 299**

Impregnated carbon seals and the utilisation thereof. Napier & Son Ltd., D. **825 300**

Glass compositions. General Electric Co. Ltd. **825 435**

Difficultly inflammable styrene polymers and production of same. Badische Anilin- & Soda-Fabrik AG. **825 611**

Distillation apparatus. Smith, A. F. **825 438**

Trace element fertilisers. Jost, W. **825 612**

Production of oxalate coatings. Pyrene Co. Ltd. **825 485**

Extracting zinc from ores. Companhia Mercantile e Industrial Ingä, and Radino, H. L. **825 487**

Benzoylpimelates and preparation thereof. Rohm & Haas Co. **825 381**

Treatment of wool. Imperial Chemical Industries Ltd. **825 402**

Recovering rare-earth oxides. Kasey, J. B. **825 305**

Polymerisation of olefins and catalysts therefor. Du Pont de Nemours & Co., E. I. **825 306**

Method for coating titanium dioxide pigment. National Lead Co. **825 404**

Graft polymers and method of making same. Dow Chemical Co. **825 680**

Stabilisation of 1-vinyl-2-pyrrolidone. General Aniline & Film Corp. **825 614**

Substituted phenoxazine derivatives. Smith, Kline & French Laboratories. **825 312**

Cosmetic preparations containing stilbene derivatives. Geigy AG., J. R. **825 413**

Production of vinyl compounds. Badische Anilin- & Soda-Fabrik AG. **825 686**

Preparation of an alumina hydrate composition. Sinclair Refining Co. **825 414**

Stabilised panthenol compositions and a process for the manufacture thereof. Hoffmann-La Roche & Co. AG., F. **825 416**

Complex carbonated metal salts of alkyl phenol sulphides. Socony Mobil Oil Co. Inc. **825 315**

Oxidation of hydrocarbons. Esso Research & Engineering Co. **825 675**

Filter for liquids or gases. Billner Vacuum Concrete SA. **825 419**

Stabilising trichloroethylene. Sicedison S.p.A. **825 420**

Electrolytic cells. Columbia-Southern Chemical Corp. **825 261**

Germicidal iodine complexes. West Laboratories Inc. **825 676**

Production of cyclo-octatetraene. Badische Anilin- & Soda-Fabrik AG. **825 385**

Recovering benzene hydrocarbons. Koppers GmbH., H. **825 388**

Preparation of liquid hydrocarbon mixtures having a high octane number. Bataafsche Petroleum Maatschappij NV., De. **825 268**

Compositions containing phenyl sulphonamides for use as mollusc repelling agents. Geigy AG., J. R. **825 466**

Synthetic resin bonded glass fibre preforms. United States Rubber Co. **825 327**

Plants for low temperature liquefaction and rectification of gaseous mixtures. Soc. l'Air Liquide, Soc. Anon, Pour l'Etude et l'Exploitation des Procedes G. Claude. **825 330**

Polymerisation of cyclic esters. Boehringer Sohn, C. H. **825 335**

Recovery of titanium tetrachloride. New Jersey Zinc Co. **825 273**

Process for separating hydrocarbons. Bataafsche Petroleum Maatschappij NV., De. **825 340**

Producing secondary alkyl-substituted aromatic hydrocarbons. Universal Oil Products Co. **825 343**

Rubber compounding. Columbian Carbon Co. **825 345**

Production of bis-chloromethyl bisulphide. Recherches et Propagande Scientifiques. **825 347**

Preparation of alkylated phenols. Bataafsche Petroleum Maatschappij NV., De. **825 599**

Production of benzylacetophenones. Badische Anilin- & Soda-Fabrik AG. **825 473**

Improving straight-run gasoline. Bataafsche Petroleum Maatschappij N.V. De. **825 353**

Production of alkanolamines. Petrochemicals Ltd. **825 475**

Organo-mercaptomethylenamides of O, O-dialkylthio (or dithio)-phosphorylacetic acids and their preparation. Montecatini Soc. Generale Per L'Industria Mineraria E Chemica. **825 397**

Abnormal addition of hydrogen bromide to vinyl aromatic compounds. Dow Chemical Co. **825 476**

Thiophosphoric acid esters. Farbenfabriken Bayer AG. **825 477**

Process for the production of crystals. European Research Associates SA. **825 356**

Linear polyesters. Du Pont De Nemours & Co., E. I. [Divided out of 825 549.] **825 550**

Purification of alcohols. Ruhrchemie AG. **825 359**

Quinone compounds and process for their manufacture. Ciba Ltd. [Divided out of 825 557.] **825 558**

2-Spiro-substituted pyrrolidines. Upjohn Co. [Divided out of 825 562.] **825 564**

DIARY DATES

MONDAY 2 NOVEMBER

S.C.I.—London: 14 Belgrave Sq., S.W.1, 6.30 p.m. 'Chemical research in Germany', by Dr. Otto Horn.

TUESDAY 3 NOVEMBER

Plastics Inst.—London: Wellcome Building, 183-193 Euston Rd., N.W.1, 6.30 p.m. 'Recent advances in synthetic rubbers', by Dr. W. F. Watson.

S.C.I.—London: Anatomy Theatre, University College, Gower St., W.C.1, 6.30 p.m. 'Delrin acetal resin', by Dr. G. F. C. Barrett.

WEDNESDAY 4 NOVEMBER

R.I.C.—London: Norwood Technical College, Knight's Hill, W. Norwood, S.E.27, 6.30 p.m. 'Synthetic fibres', by Dr. R. Johnston.

S.A.C.—London: Chemical Soc., Burlington House, W.1, 7 p.m. Meeting for reading of original papers.

THURSDAY 5 NOVEMBER

Polarographic Soc.—London: 'Duke of York', 8 Dering St., W.1, 7.30 p.m. 'Polarography of metallic cations in the presence of bisquaternary ammonium ions', by Dr. P. O. Kane.

R.I.C.—London: Brunel College of Technology, Woodlands Rd., Acton, W.3, 6.30 p.m. 'Recent developments in co-ordination chemistry', by Prof. R. S. Nyholm.

S.C.I.—London: 14 Belgrave Sq., S.W.1, 6.15 p.m. Meeting on 'The rhizosphere'.

S.C.I.—Nottingham: East Midlands Gas Board, 51-55 Lower Parliament St., 7.30 p.m. 'Corrosion factors affecting the choice of stainless steels for chemical plant', by H. T. Shirley.

FRIDAY 6 NOVEMBER

S.C.I.—London: Society's Rooms, 14 Belgrave Sq., S.W.1, 6.30 p.m. 'Electrolytic methods in preparative organic chemistry', by Dr. B. C. L. Weedon.

CLASSIFIED ADVERTISEMENTS

CLASSIFIED RATES: All sections 5d. per word. Minimum 8/-. Three or more insertions 4d. per word. Box Number 2/- extra. Up to 10 a.m. Tuesday for insertion same week.

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SITUATIONS VACANT

VACANCIES IN SOUTH AFRICA

ELECTRICITY SUPPLY COMMISSION OF THE UNION OF SOUTH AFRICA

The Rand and Orange Free State Undertaking of the Electricity Supply Commission of the Union of South Africa supplies power to an area of some 40,000 square miles in the Transvaal and Orange Free State. It operates 10 thermal stations with turbo-alternators up to 60 MW and boilers up to 580,000 lb. per hour, 950 lb. per sq. in., 925° F. and is building another station to accommodate 10-100 MW turbo-alternators and 10-900,000 lb. per hour, 1,250 lb. per sq. in., 965° F. boilers. The Undertaking's sustained demand is 1,900 kW at present and units sent out in 1958 exceeded 11,000 million.

Transmission is at 275 kV, 132 kV and 88 kV and distribution at 88 kV and lower voltages. The circuit mileage in commission at the end of 1958 was 5,000 miles.

The Undertaking is expanding rapidly and to meet this expansion applications are invited for engineering personnel in the following categories.

The total emoluments per annum in brackets.

SHIFT ENGINEERS (£805-£1,335).

P.F. STATION CONBUSTION ENGINEERS (£1,117-£1,443).

AREA COMBUSTION ENGINEERS (£1,367-£2,039).

DISTRICT ASSISTANTS (£742-£1,075); **DISTRICT ENGINEERS** (£992-£1,335); **SECTIONAL ENGINEERS** (£1,169-£1,605) for transmission and distribution.

SHIFT LOAD DESPATCHER (£1,221-£1,660) for System Operation Department.

PROTECTION ENGINEERS and **METER AND INSTRUMENT ENGINEERS** (£836-£1,660) for Electrical Test Department.

ASSISTANT INSTRUMENT ENGINEERS (£1,273-£1,768); **INSTRUMENT TECHNICIANS** (£961-£1,205); and **INSTRUMENT MECHANICS** (£711-£1,140) for Instrument (Mechanical) Department.

TELECOMMUNICATIONS ENGINEER (£1,325-£1,985); **ASSISTANT TELECOMMUNICATIONS ENGINEER** (£961-£1,530).

CABLE ENGINEER (£1,325-£1,985); **ASSISTANT CABLE ENGINEER** (£961-£1,530).

ASSISTANT ENGINEERS (TECHNICAL) (£1,221-£1,985) and **ENGINEERING ASSISTANTS (ELECTRICAL)** (£909-£1,660) for Power Plant Maintenance.

AREA CHEMISTS (£1,482-£1,985); **POWER STATION CHEMISTS** (£1,065-£1,714).

ASSISTANT ENGINEERS (£1,221-£1,985) for general departmental duties.

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The total emoluments include, in addition to basic salary, a variable cost-of-living allowance and a holiday allowance.

All positions afford good prospects of advancement. Rail and sea passages will be provided for selected applicants, their wives and minor children, subject to agreement to serve the Commission for at least three years.

A Senior Engineer from South Africa will interview selected candidates in London at end November/early December.

For further particulars apply in writing to the
London Representative,
Electricity Supply Commission,
723 The Adelphi, John Adam Street, London, W.C.2.

BOX NUMBERS: *Reply c/o "Chemical Age" · Bouverie House · Fleet Street EC4.*

SITUATIONS VACANT: continued

AGRICULTURAL RESEARCH COUNCIL require two Honours Graduates in Biochemistry at their Low Temperature Research Station, to work on project administered under U.S.A. Counterpart Funds. Appointment will be for a period of from 3 to 5 years to investigate constituents of animal connective tissue and related enzyme systems. Subjects for study are of type generally suitable for submission as dissertations for a higher degree. Salary according to qualifications in range £615-£800. Superannuation under F.S.S.U. Applications, with names of two referees, to the Secretary of the Low Temperature Research Station, Downing Street, Cambridge.

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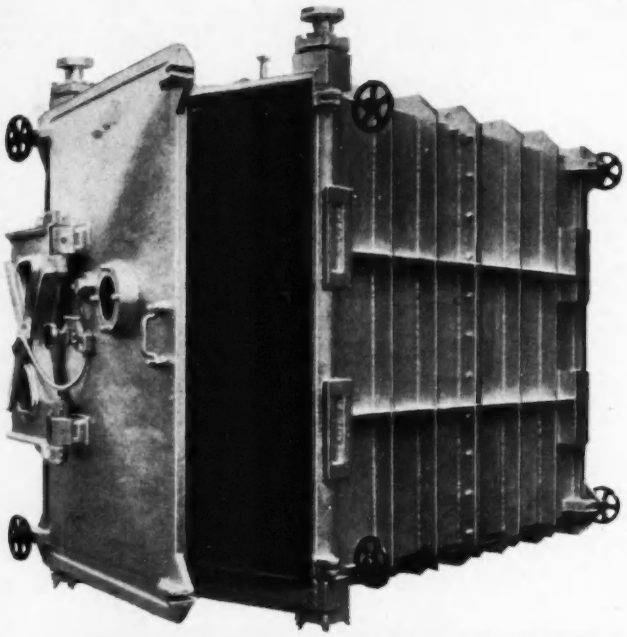

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